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United States
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Beltsville Agricultural
Research Center
Beltsville, Maryland

August 1991

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National Potato Germplasm Evaluation and Enhancement Report, 1990

Sixty-First Annual Report
by Cooperators

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National Potato Germplasm Evaluation and Enhancement Report, 1990

Sixty-First Annual Report
by Cooperators

Compiled and Edited
by
Kathleen G. Haynes
Vegetable Laboratory
Beltsville Agricultural Research Center
Agricultural Research Service
U. S. Department of Agriculture
Beltsville, Maryland

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UNITED STATES DEPARTMENT OF AGRICULTURE
BELTSVILLE AGRICULTURAL RESEARCH CENTER (BARC),
BELTSVILLE, MARYLAND, AND CHAPMAN, ECHO LAKE, AND
AROOSTOOK FARMS, PRESQUE ISLE, MAINE

K.G. HAYNES, R.W. GOTH, and D.R. WILSON

Introduction

Objectives: The USDA potato breeding program at Beltsville has four main objectives: (1) to develop improved pest-resistant germplasm lines and varieties; (2) to develop improved germplasm lines and varieties for processing directly out of cold storage; (3) to enhance germplasm for specific characteristics relating to pest resistance, yield, environmental stress, human nutrition and consumer acceptance; and (4) to develop statistical genetic models for some of the new breeding strategies.

Breeding

BARC: Hybridizations in the greenhouse at BARC in early 1990 were made among clonal material possessing bacterial wilt, scab and Verticillium resistance; resistance to heat necrosis; high quality; processing and fresh market potential; different skin types; yellow flesh; and adaptability to various ecological test zones. Five hundred and seventy-nine crosses were successful. Approximately 25,300 seedling tubers were produced from 130 parental combinations: 30 were grown for Verticillium evaluations, 2 were grown for distribution to Dr. D.P. Weingartner, Florida, for corky ring spot evaluations; and the remainder were grown for varietal evaluations. All were grown on the Chapman Farm.

Presque Isle: Open pollinated seeds were collected from among 245 clones in a diploid hybrid Solanum tuberosum Group Phureja and Stenotomum population during September.

Disease
Evaluations

Aroostook Farm: Preliminary and advanced trials were conducted on breeding clones and varieties for resistance to scab, Verticillium wilt, early blight, late blight, pinkeye, leafroll and Rhizoctonia. Dr. Simeon Leach of Maine continued to evaluate some of our germplasm for resistance to Fusarium and Rhizoctonia. Dr. Bill Brodie of New York continued to evaluate our germplasm for resistance to the golden nematode.

Scab: Seventeen advanced selections and four standard varieties were evaluated for the third year in one advanced trial. These 17 selections were also evaluated by Dr. Robert Young in West Virginia. Three of these selections had a level of resistance equal to or better than Ontario at the

two locations: B0184-30, B0186-3, and B0180-31. Thirteen advanced selections (and three standard varieties) were evaluated for the first time in a second advanced trial. Although the disease pressure was not as great in this trial, B9922-11 had a level of resistance equal to Russet Burbank. B0175-21 and B0178-34 were as susceptible as Green Mountain. Forty-four selections were evaluated in a preliminary trial. Of these, B0339-1, B0348-2, and B0486-1 were the most resistant.

Verticillium: Twelve advanced selections and five standard varieties continued to be evaluated for their resistance to Verticillium. These clones were also evaluated by Dr. Neil Anderson in Minnesota. Of these, B0169-56, B0184-30 and B0240-11 had a level of resistance equal to Abnaki. B0214-9 was more susceptible than Superior. Twenty-two advanced selections (and six standard varieties) were evaluated in replicated trials for the first time. Among these, B0239-20, B0184-18, and B0234-8 had a level of resistance equal to Abnaki. B0179-19, B0178-16 and B0172-12 were as susceptible as Superior. Thirty selections (and five standard varieties) were evaluated in small plots in preliminary tests.

Early blight: One hundred twenty-eight clones were evaluated in the early blight plot. Most of these clones were extremely late maturing and vigorous. The more resistant clones will be reevaluated in 1991.

Late blight: Eighty-seven clones were evaluated in the late blight plot. B0288-17, B0690-5, B0692-4, and B0793-4 were more resistant than Atzimba.

Processing Evaluations

Echo Lake: Round white and russet yield trials (Tables 1-10) were planted in a randomized complete block design with four replications of 25 hill plots at Echo Lake in May. Plants were spaced at 9 inches within the row in the round whites, and at 12 inches in the russets. At harvest tubers from each plot were graded, specific gravity was determined by the weight in air and weight in water method, the five largest tubers were cut to determine the presence of hollow heart (20 tuber sample per clone), and tuber samples were stored at 40°F, 45°F, and 50°F. Samples were processed out of 40°F, 45°F, 50°F, and following a three week reconditioning period out of 40°F during January, February, and, with the exception of 50°F, March. For each combination of storage temperature and processing date, 10 tubers per sample from each plot were cooked (40 samples per clone).

Potato chips were made from each round white sample by taking 1/16-inch slices from cross and lengthwise sections of each tuber. Lengthwise chips were used to detect possible increase in reducing sugars, particularly near the stem end. Slices were rinsed in water and placed on paper towels to remove excess moisture. Chips were then fried at 340°F in Primex vegetable shortening until bubbling ceased.

The yield and specific gravity of B0175-20, B0178-34, and B0257-3 have been equal to Atlantic's for the last two years. Hollow heart was a severe problem in large tubers of B0175-20 in 1989 but was not observed in 1990. These three clones may be suitable for chipping from 50°F storage from October through December. Hollow heart, moderate yield and specific gravity were observed again this year in B0245-15. However, it continues to chip well from cold storage through March. Dr. Gregory Porter, University of Maine, will be conducting management studies on this clone to evaluate its potential as an early maturing chipping line for processing from long term cold storage. Although B0256-1 produced unacceptably dark chips in our trials, it has chipped very well directly from the field for our southern cooperators. The yield and specific gravity of B0256-1 have been equal to Atlantic's for the last two years. No internal defects have been observed at our location.

Russet types were processed into french fries. A 3/8-inch diameter plug was cut from the cross and lengthwise sections of each tuber, washed, dried, and fried at 360°F for five minutes.

B9922-11 continues to show promise as a fresh market russet for the east coast. Hollow heart was a problem in 1989 (6/20) but was only a slight problem in 1990 (2/20). It was one of the few russet clones to produce tubers weighing more than 10 ounces in any appreciable quantity in 1990 despite the dry conditions during most of the summer. With properly timed irrigation, this clone may have the potential to produce count size tubers.

After frying, each potato chip and french fry was classified into color classes. Chip classes ranged from 1=very light to 10=very dark. French fry classes ranged from 1=very light to 5=very dark. Weighted averages were calculated by multiplying the number of chips or french fries in each color class by the color class, totaling, and dividing by the number of chips or french fries in each sample.

Color ratings were made by using the PCII reference color chart 1206-U.

Germplasm
Enhancement and
Varietal
Development

Chapman Farm: Of the approximately 25,300 seedling tubers planted, 2,942 were saved for replanting in 1991. Of this total, 2,004 were saved for Verticillium evaluations, 164 were saved for corky ring spot evaluations, and 774 were saved for varietal evaluations in 12-hill plots in 1991. Of the 502 clones saved for soft rot evaluations in 1989, 234 were saved for further evaluation in 1991. The 288 diploid clones saved in 1989 were evaluated for yield, specific gravity, and yellow flesh in 1990, and will be replanted in 1991. The 130 clones saved in 1989 for early blight evaluations were replanted in 1990. Of the 781 clones evaluated in 12-hill plots, 268 were saved for evaluation in 40-hill plots in 1991. Of the 399 clones evaluated in 40-hill plots, 164 were saved for evaluation in 60-hill plots in 1991. Of the 141 clones evaluated in 60-hill plots, 67 were saved for evaluation in 80-hill plots in 1991. Of the 54 clones evaluated in 80-hill plots, 34 were saved for evaluation in 100-hill plots in 1991. Of the 14 clones evaluated in 100-hill plots, 9 were saved for evaluation in 150-hill plots in 1991. Of the 47 clones evaluated in 150-hill plots, 22 were saved for evaluation in 200-hill plots in 1991. Of the 103 clones evaluated in 200-hill plots, 52 were saved for evaluation in 200-hill plots in 1991.

All index materials planted on Chapman were done in tuber units with six feet between rows and five feet between units to continue the virus/viroid indexing program.

Seed tubers of promising clones and standard varieties were distributed for adaptability and/or processing trials and/or preliminary evaluation to Maine, New York (Upstate and Long Island), New Jersey, Pennsylvania, Virginia, North Carolina, Georgia, Florida, Michigan, Ohio, California, and Colorado.

Echo Lake: Twenty-eight clones were planted in a randomized complete block design with three replications of five hills to evaluate their potential for the yellow flesh market. Dr. Stephen Sindén, BARC, determined the beta-carotene content of some of the more promising lines in this population.

Statistical
Genetic Modeling

The covariance between diploid species parent and its tetraploid offspring obtained from 4x-2x hybridizations was derived (J. Heredity 81:208-210). This revealed that, regardless of the mechanism of 2n pollen formation, inbreeding can occur in the derived tetraploid (DT). The covariance between haploid-species parent and its tetraploid offspring obtained from 4x-2x hybridizations is being derived. In addition, the inbreeding coefficient of the DT for the various breeding strategies is being derived.

Summary

Considerable progress is being made in all four objectives in the potato breeding program. "Coastal Chip" (B9792-157) was released this year. There are several advanced breeding lines that continue to look promising for chipping: B0175-20, B0178-34, B0256-1 and B0257-3. B9922-11 continues to look promising as a fresh market russet for the east coast. Crosses between Verticillium, scab, soft rot, bacterial wilt or late blight disease resistant clones and clones with processing or fresh market potential are continuing. Genetic studies are in progress on the inheritance of resistance to Verticillium, scab and heat necrosis. The germplasm base is being expanded through the introduction of diploid germplasm. Statistical genetic modelling of interploidy hybridizations is proceeding in an effort to facilitate the incorporation of new germplasm into the breeding effort.

BARC Table 1. Yield, tuber size distribution, and quality characteristics of round whites harvested 117 days after planting at Echo Lake in 1990.

Pedigree	Mkt		Tuber Size Distribution										SG ¹	HH ²	IN ³
	CWT/A	%Mkt	<1	7/8"	1	7/8-2	1 1/4"	2	1 1/4-3	1 1/4"	3	1 1/4-4"	>4"		
Atlantic	307	89	11.0			45.0			40.7		3.3	0.0	85	0	1
B0048-9	403	95	5.3			26.4			55.8		12.5	0.0	78	2	0
B0172-12	284	92	8.1			33.1			50.3		8.5	0.0	72	3	4
B0172-15	324	98	2.2			9.3			57.2		31.3	0.0	74	0	0
B0172-22	339	95	4.3			20.3			67.2		7.3	8.1	78	0	1
B0174-11	315	95	3.8			17.5			59.4		18.5	7.6	79	0	0
B0174-16	218	89	10.7			35.6			50.3		3.4	0.0	86	0	0
B0174-19	300	92	8.5			37.5			52.1		2.0	0.0	85	0	6
B0174-7	214	91	9.3			43.9			45.6		1.2	0.0	86	0	0
B0175-20	319	96	4.0			27.3			59.8		8.9	0.0	86	0	0
B0175-21	223	93	6.7			33.8			55.2		4.3	0.0	88	0	0
B0176-24	307	93	6.0			21.9			55.7		15.6	8.2	81	0	0
B0177-20	270	89	11.2			35.2			51.6		2.0	0.0	82	0	0
B0178-14	255	75	25.0			56.8			18.2		0.0	0.0	88	0	0
B0178-16	292	90	9.6			36.5			49.9		4.1	0.0	87	0	0
B9955-11	250	92	8.3			31.4			58.5		1.8	0.0	86	0	0
Monona	274	92	7.6			32.7			49.0		10.6	0.0	61	0	0
Norchip	290	85	15.1			55.6			29.3		0.0	0.0	76	0	0
LSD (.05)	44												04		

¹1.0 omitted.

²Number of tubers with hollow heart out of the largest 20 cut.

³Number of tubers with internal necrosis out of the largest 20 cut.

BARC Table 1 (continued)

Temperature Date	50°F		45°F		40°F		40°-70°F		50°F		45°F	
	1/9	spt ⁵	chip	spt	chip	spt	chip	spt	chip	spt	chip	spt
Pedigree	chip ⁴	spt ⁵	chip	spt	chip	spt	chip	spt	chip	spt	chip	spt
Atlantic	6.9	S	9.3	S	9.2	O	7.7	S	8.8	M	9.3	S
B0048-9	7.8	O	9.2	S	9.4	S	8.3	S	8.4	S	9.2	S
B0172-12	7.1	S	8.2	S	8.2	S	7.6	S	7.7	M	8.5	S
B0172-15	7.2	S	9.4	S	8.9	O	9.5	S	7.9	M	9.2	S
B0172-22	6.8	S	8.3	S	8.8	O	7.9	S	7.8	M	8.4	M
B0174-11	7.4	M	9.3	S	9.1	S	8.9	S	8.7	L	9.0	M
B0174-16	7.9	M	9.2	S	8.9	S	8.6	S	8.4	L	9.3	M
B0174-19	8.2	M	9.8	S	9.7	S	9.2	S	9.0	M	9.9	M
B0174-7	6.9	M	7.9	S	7.8	S	7.4	M	7.7	M	8.2	M
B0175-20	7.6	S	8.8	S	8.3	S	7.8	S	8.5	M	8.6	S
B0175-21	7.9	S	8.9	S	9.2	S	8.6	S	8.5	L	9.3	S
B0176-24	8.4	S	8.1	S	8.7	O	8.5	S	8.1	M	8.9	S
B0177-20	7.7	S	8.7	S	9.2	S	7.6	S	8.6	L	8.8	M
B0178-14	7.8	S	9.4	M	9.3	S	8.4	S	8.5	L	9.4	M
B0178-16	8.0	M	8.1	M	8.5	S	8.1	S	8.0	M	9.1	M
B9955-11	7.3	S	7.5	M	7.5	M	7.1	M	7.6	L	8.4	M
Monona	7.1	S	7.4	S	7.8	O	7.6	S	6.8	M	7.9	S
Norchip	7.2	S	8.6	S	9.1	S	8.0	S	7.9	M	9.3	M

⁴Chips: 1-7 = satisfactory

⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 1 (continued)

Temperature		40°F		40°-70°F		45°F		40°F		40°-70°F	
Date		2/11		2/20		3/7		3/4		3/21	
Pedigree	chip ⁴	Spt ⁵	chip	Spt	chip	Spt	chip	Spt	chip	Spt	chip
Atlantic	9.3	S	7.4	M	9.0	L	9.2	S	7.8	M	
B0048-9	9.2	0	8.3	S	9.4	S	9.5	O	9.1	S	
B0172-12	7.8	S	7.8	S	8.0	M	8.6	S	8.2	S	
B0172-15	8.8	S	8.4	S	8.7	M	9.0	M	8.8	S	
B0172-22	8.4	S	7.1	S	8.4	L	8.7	S	7.8	S	
B0174-11	9.2	M	8.2	M	8.6	L	9.1	M	8.4	M	
B0174-16	9.2	S	8.5	S	8.6	L	9.3	S	8.7	M	
B0174-19	9.6	S	8.8	S	9.9	M	9.9	M	9.5	S	
B0174-7	8.2	S	6.6	S	7.9	L	8.6	M	8.5	M	
B0175-20	8.3	S	7.8	S	9.0	S	8.5	S	8.4	S	
B0175-21	9.5	S	7.5	S	9.3	M	9.3	S	8.4	M	
B0176-24	8.7	S	8.1	S	9.3	L	9.2	S	8.6	M	
B0177-20	8.7	S	7.2	M	8.3	L	8.9	M	7.9	M	
B0178-14	8.9	S	8.2	S	9.2	VL	9.6	M	9.1	M	
B0178-16	8.1	S	7.2	S	8.6	M	9.4	M	8.0	M	
B9955-11	7.6	M	7.5	M	7.5	L	8.0	L	8.2	L	
Monona	8.0	S	7.1	S	7.6	M	8.1	S	7.8	S	
Norchip	8.7	S	8.1	S	8.5	M	9.6	S	8.2	M	

⁴Chips: 1-7 = Satisfactory⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 2. Yield, tuber size distribution, and quality characteristics of round whites harvested 117 days after planting at Echo Lake in 1990.

Pedigree	Mkt		Tuber Size Distribution										SG ¹	HH ²	IN ³
	CWT/A	%Mkt	<1	7/8"	1	7/8-2	1/4"	2	1/4-3	1/4"	3	1/4-4"	>4"		
Atlantic	329	91	9.1	43.9	42.9	4.1	0.0	86	0	0					
B0178-30	262	90	9.6	34.6	48.3	7.4	0.0	84	0	4					
B0178-34	335	92	7.9	39.9	50.4	1.8	0.0	85	0	0					
B0178-35	304	90	10.1	34.1	52.6	3.2	0.0	89	0	0					
B0179-1	233	88	11.7	46.3	41.2	0.8	0.0	84	0	0					
B0179-17	327	93	6.9	36.1	51.8	5.2	0.0	79	0	0					
B0179-18	302	96	4.1	18.9	67.0	10.0	0.0	82	1	1					
B0179-19	292	82	18.0	56.0	25.9	0.0	0.0	89	0	1					
B0179-3	200	70	29.7	57.7	12.6	0.0	0.0	90	0	0					
B0179-5	255	90	9.9	50.2	36.6	3.3	0.0	89	0	1					
B0179-6	256	83	16.9	54.2	28.9	0.0	0.0	89	0	0					
B0180-24	357	89	10.8	36.1	52.0	1.1	0.0	77	0	0					
B0180-36	358	94	5.9	27.4	61.6	5.1	0.0	82	0	0					
B0183-25	333	89	11.2	46.8	38.8	3.3	0.0	75	0	0					
B0184-18	334	96	4.3	22.3	60.9	12.6	0.0	66	1	0					
B0200-36	220	80	20.0	46.9	32.5	0.6	0.0	80	0	1					
Kennebec	311	94	6.4	24.7	61.1	7.9	0.0	64	0	0					
Superior	260	94	6.3	35.8	55.5	2.4	0.0	75	0	4					
LSD (.05)	44													06	

^{1,2,3} See Table 1.

Table 2 (continued)

Temperature Date	50°F 1/9		45°F 1/23		40°F 1/16		40°-70°F 1/30		50°F 2/4		45°F 2/7	
	chip ⁴	spt ⁵	chip	spt	chip	spt	chip	spt	chip	spt	chip	spt
Pedigree												
Atlantic	7.5	S	8.5	S	9.0	S	7.2	S	7.9	L	8.8	M
B0178-30	8.2	L	9.6	M	9.6	M	9.0	M	8.9	VL	9.5	VL
B0178-34	7.2	M	8.4	S	8.4	S	7.5	S	8.1	M	8.1	M
B0178-35	8.5	M	9.2	L	9.5	M	9.1	M	9.0	VL	8.7	VL
B0179-1	7.2	M	8.5	M	8.9	S	7.4	M	8.4	VL	8.7	M
B0179-17	7.9	S	8.9	S	9.3	O	8.0	S	9.1	M	8.8	S
B0179-18	8.3	M	9.3	S	9.0	S	8.2	S	8.5	L	9.4	M
B0179-19	8.8	L	9.6	M	9.7	L	8.9	M	9.7	VL	9.4	VL
B0179-3	7.0	L	7.5	VL	8.3	L	7.7	VL	7.4	VL	7.4	VL
B0179-5	8.4	S	9.4	S	9.3	S	9.0	S	9.1	M	9.0	M
B0179-6	7.1	L	8.1	VL	8.3	L	7.7	L	8.3	VL	7.8	VL
B0180-24	8.5	M	9.1	M	9.3	S	8.6	M	9.3	VL	8.7	L
B0180-36	7.4	M	7.7	M	9.0	M	7.9	M	8.1	M	7.9	M
B0183-25	9.4	S	10.0	S	10.0	S	9.9	S	9.8	M	9.8	M
B0184-18	8.0	S	8.5	O	9.2	O	8.9	S	8.4	S	8.2	S
B0200-36	6.9	S	8.2	S	8.6	S	7.3	S	7.2	L	8.0	M
Kennebec	7.7	S	9.2	O	9.4	O	8.2	S	8.7	M	9.5	S
Superior	8.2	M	8.9	S	9.7	S	8.9	S	8.5	L	9.5	M

⁴Chips: 1-7 = Satisfactory⁵Sprout length:

0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 2 (continued)

Temperature		40°F		40°-70°F		45°F		40°F		40°-70°F	
Date		2/12		2/20		3/7		3/4		3/21	
Pedigree	chip ⁴	spt ⁵	chip	spt	chip	spt	chip	spt	chip	spt	chip
Atlantic	8.8	S	7.2	M	8.7	M	9.4	S	7.9	M	7.9
B0178-30	9.2	L	8.9	M	9.6	VL	9.7	VL	9.1	VL	9.1
B0178-34	8.1	S	7.5	S	8.0	VL	8.6	S	7.9	M	7.9
B0178-35	8.5	M	8.5	M	9.1	VL	9.5	VL	9.1	VL	9.1
B0179-1	8.4	M	8.0	S	8.5	VL	8.9	L	8.1	L	8.1
B0179-17	9.3	S	7.5	S	8.9	L	9.1	S	7.8	M	7.8
B0179-18	8.9	M	8.5	S	9.4	VL	9.4	M	8.6	M	8.6
B0179-19	9.4	VL	8.2	M	9.5	VL	9.7	VL	8.2	L	8.2
B0179-3	7.4	VL	7.3	VL	8.1	VL	8.3	VL	7.9	VL	7.9
B0179-5	9.2	S	8.5	S	8.9	L	9.6	S	8.8	S	8.8
B0179-6	7.8	VL	7.7	L	7.9	VL	8.4	VL	8.2	VL	8.2
B0180-24	9.0	S	8.6	M	9.0	VL	9.5	M	9.2	VL	9.2
B0180-36	8.1	M	8.0	M	8.2	L	8.6	M	8.5	M	8.5
B0183-25	10.0	S	9.8	S	9.7	M	10.0	S	10.0	M	10.0
B0184-18	8.5	S	7.9	S	9.2	M	8.9	S	8.8	M	8.8
B0200-36	8.3	S	7.6	S	8.2	L	9.2	S	8.1	M	8.1
Kennebec	9.2	S	8.1	S	9.4	M	9.7	S	8.8	S	8.8
Superior	9.8	S	8.6	S	9.6	L	9.8	S	9.5	M	9.5

⁴Chips: 1-7 = Satisfactory

⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 3. Yield, tuber size distribution, and quality characteristics of round whites harvested 117 days after planting at Echo Lake in 1990.

Pedigree	Mkt		Tuber Size Distribution										SG ¹	HH ²	IN ³
	CWT/A	%Mkt	<1 7/8"	1 7/8-2 1/4"	2 1/4-3 1/4"	3 1/4-4"	>4"								
Atlantic	341	92	8.5	44.6	45.5	1.4	0.0	83	0	0					
B0202-4	335	94	5.7	19.7	66.9	7.7	0.0	71	0	0					
B0203-21	330	95	3.4	25.2	57.8	12.4	1.2	68	0	0					
B0207-9	298	93	6.9	36.4	50.1	6.6	0.0	81	0	0					
B0209-1	348	94	2.5	14.2	61.2	18.4	3.8	68	0	0					
B0214-9	269	92	2.6	10.3	51.9	30.3	5.0	68	0	0					
B0233-1	344	95	3.9	19.7	66.8	8.9	0.7	66	0	0					
B0234-4	313	95	4.6	17.0	66.5	12.0	0.0	72	1	0					
B0234-8	345	96	3.8	19.5	64.0	12.1	0.7	74	0	0					
B0237-6	297	93	6.6	26.4	60.6	6.4	0.0	71	1	0					
B0237-9	321	94	6.0	28.8	53.2	12.0	0.0	70	1	3					
B0238-11	247	84	16.0	52.6	29.8	1.6	0.0	70	0	0					
B0238-13	285	89	10.7	32.7	53.2	3.3	0.0	73	0	0					
B0238-16	242	78	21.9	57.7	20.4	0.0	0.0	79	0	0					
B0238-21	247	89	11.0	50.1	37.8	1.2	0.0	65	0	0					
B0238-4	299	92	7.6	33.6	57.0	1.7	0.0	77	0	1					
Coastal Chip	350	91	9.0	40.2	47.8	2.9	0.0	71	0	0					
Superior	284	96	3.6	33.0	59.2	4.1	0.0	73	0	5					
LSD (.05)	50											05			

^{1,2,3} See Table 1.

Table 3 (continued)

Temperature Date	50°F 1/9	45°F 1/23	40°F 1/16	40°-70°F 1/30	50°F 2/4	45°F 2/7
Pedigree	chip ⁴	spt ⁵	chip	spt	chip	spt
Atlantic	7.8	S	8.7	O	8.0	M
B0202-4	8.0	S	9.3	O	8.5	S
B0203-21	8.3	S	9.5	O	8.5	M
B0207-9	7.8	M	8.8	S	8.2	L
B0209-1	8.2	S	9.6	O	9.0	M
B0214-9	7.1	S	8.8	O	8.0	M
B0233-1	8.2	S	9.8	O	8.3	M
B0234-4	7.1	S	8.1	O	7.3	L
B0234-8	8.0	S	8.3	O	8.4	M
B0237-6	6.6	S	7.7	O	7.2	M
B0237-9	7.7	M	9.5	S	9.1	L
B0238-11	8.3	M	8.4	O	8.1	L
B0238-13	6.8	S	7.6	O	7.3	L
B0238-16	7.3	S	8.1	S	7.7	L
B0238-21	7.2	M	8.6	S	8.0	M
B0238-4	7.0	S	9.4	S	8.3	M
Coastal Chip	7.2	M	8.7	S	7.8	VL
Superior	8.7	M	9.4	O	9.6	L

⁴Chips: 1-7 = Satisfactory⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 3 (continued)

Temperature Date	40°F		40°-70°F		45°F		40°F		40°-70°F	
	2/12	spt ⁵	chip	spt	chip	spt	chip	spt	chip	spt
Pedigree	chip ⁴	spt ⁵	chip	spt	chip	spt	chip	spt	chip	spt
Atlantic	9.1	S	7.5	M	8.6	L	9.8	S	7.8	M
B0202-4	9.3	S	8.3	S	9.0	L	9.6	M	9.4	M
B0203-21	9.8	S	8.2	S	9.2	L	9.9	S	8.3	M
B0207-9	8.7	M	8.2	L	8.5	VL	9.1	M	8.3	L
B0209-1	8.8	S	8.6	S	8.7	L	9.7	S	8.6	S
B0214-9	8.9	O	8.4	S	8.4	L	9.7	S	8.7	S
B0233-1	9.2	S	8.5	S	8.2	L	9.7	S	8.2	S
B0234-4	8.1	S	7.2	S	7.5	VL	8.2	S	7.8	M
B0234-8	8.3	O	7.2	S	7.8	M	9.2	S	7.2	M
B0237-6	7.7	S	7.3	M	7.2	L	8.0	S	7.4	M
B0237-9	9.4	S	9.1	M	8.8	VL	9.6	M	8.9	VL
B0238-11	9.1	S	7.8	M	8.1	L	9.0	M	8.9	L
B0238-13	7.5	S	7.4	M	7.5	M	7.7	S	7.3	M
B0238-16	8.2	M	7.2	M	7.7	VL	8.5	L	7.8	L
B0238-21	8.5	S	8.1	S	8.0	L	8.8	M	8.9	M
B0238-4	9.6	S	8.6	S	8.0	M	9.8	S	9.2	S
Coastal Chip	8.6	S	7.8	L	7.9	VL	9.4	L	8.3	L
Superior	9.5	S	9.1	M	8.9	L	10.0	S	9.2	M

⁴Chips: 1-7 = Satisfactory⁵Sprout length:

0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 4. Yield, tuber size distribution, and quality characteristics of round whites harvested 117 days after planting at Echo Lake in 1990.

Pedigree	Mkt CWT/A	%Mkt	Tuber Size Distribution										SG ¹	HH ²	IN ³
			<1	1	2	3	4	5	6	7	8	>4"			
Atlantic	370	92	7.9	40.5	49.3	2.4	0.0	84	0	1					
B0239-20	347	97	3.3	11.9	61.2	23.7	0.0	68	0	0					
B0239-29	346	92	7.7	33.3	51.7	7.2	0.0	72	5	6					
B0240-11	351	92	7.4	27.4	54.5	10.0	0.7	74	0	0					
B0241-8	379	91	5.2	18.0	42.1	30.6	4.1	74	1	0					
B0242-2	380	94	6.5	31.5	58.2	3.8	0.0	69	0	0					
B0242-3	386	96	3.9	21.3	58.8	16.0	0.0	72	0	0					
B0242-31	253	86	13.7	50.4	35.4	0.5	0.0	68	0	0					
B0243-10	370	97	3.0	18.9	65.2	12.8	0.0	76	0	0					
B0243-11	367	96	2.9	13.5	64.9	17.2	1.6	69	0	0					
B0243-18	355	94	6.3	23.8	58.6	11.3	0.0	70	0	0					
B0243-20	300	96	3.7	23.5	64.6	8.2	0.0	78	2	3					
B0243-7	316	95	5.5	29.4	63.1	2.0	0.0	73	1	2					
B0244-6	263	79	21.3	49.4	29.3	0.0	0.0	73	0	0					
B0245-15	320	96	1.9	8.4	43.8	43.7	2.3	74	3	2					
B0245-8	337	98	2.0	10.2	61.3	26.5	0.0	76	8	0					
Monona	332	94	5.7	27.4	51.0	15.9	0.0	63	0	1					
Norchip	354	86	14.2	46.1	37.1	2.5	0.0	74	0	1					
LSD (.05)	48												03		

^{1,2,3} See Table 1.

Table 4 (continued)

4Chips: 1-7 = satisfactory
5Sprout length: 0 = no sprouts
S = <0.5"
M = 0.5-1.5"
L = 1.5-2.5"
VL = >2.5"

4Chips: 1-7 = Satisfactory

5 Sprout length: 0 = no sprouts

$$S = \langle 0.5 \rangle$$
 $M = 0.5 - 1.5''$

1. 5-2 5"

ИЗДАТЕЛЬСТВО

BARC Table 4 (continued)

Temperature	40°F	40°-70°F	45°F	40°F	40°-70°F					
Date	2/19	2/20	3/7	3/4	3/21					
Pedigree	Chip ⁴	Spt ⁵	chip	Spt	Chip	Spt				
Atlantic	9.4	S	7.6	M	9.1	L	9.9	S	8.3	M
B0239-20	7.8	S	6.8	S	7.4	M	8.0	S	7.3	M
B0239-29	9.0	M	7.9	M	8.2	VL	9.7	S	8.9	M
B0240-11	8.3	S	7.5	S	7.5	L	8.8	S	7.6	M
B0241-8	9.3	S	8.2	S	8.5	M	9.6	S	8.3	S
B0242-2	8.1	M	7.3	M	7.1	M	7.7	M	7.9	M
B0242-3	8.7	S	7.9	S	8.0	L	8.3	S	8.2	M
B0242-31	8.8	M	7.3	M	8.5	L	9.4	M	8.7	M
B0243-10	8.5	S	6.8	S	8.2	M	8.9	S	7.6	S
B0243-11	8.1	S	7.3	M	7.5	VL	8.3	M	8.0	M
B0243-18	8.0	M	6.6	M	7.7	VL	7.7	M	7.8	M
B0243-20	9.4	L	7.4	M	8.9	VL	9.2	L	8.4	M
B0243-7	8.9	M	7.9	M	8.3	VL	9.3	L	8.3	L
B0244-6	9.0	S	8.2	S	8.2	M	9.1	S	9.1	M
B0245-15	7.3	S	7.0	S	7.0	O	7.7	S	7.2	S
B0245-8	8.0	S	7.2	S	7.3	M	8.6	S	7.6	M
Monona	7.7	S	7.3	S	7.4	M	8.4	S	7.8	M
Norchip	9.3	S	7.8	S	8.4	L	9.4	S	8.5	S

⁴Chips: 1-7 = satisfactory

⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 5. Yield, tuber size distribution, and quality characteristics of round whites harvested 117 days after planting at Echo Lake in 1990.

Pedigree	Mkt		Tuber Size Distribution										SG ¹	HH ²	IN ³
	CWT/A	%Mkt	<1	7/8"	1	7/8-2	1/4"	2	1/4-3	1/4"	3	1/4-4"	>4"		
Atlantic	364	91	8.7		42.6				45.8		2.9	0.0	81	0	0
B0246-4	337	95	5.4		31.5				59.8		3.4	0.0	68	1	0
B0246-6	371	95	4.4		18.0				64.8		12.2	0.6	73	0	0
B0246-7	374	92	7.9		37.5				49.4		5.3	0.0	77	0	0
B0246-8	341	94	5.9		35.9				55.8		2.5	0.0	79	0	0
B0255-5	388	92	8.1		42.5				48.1		1.3	0.0	63	0	0
B0255-9	296	92	8.3		42.3				45.3		4.0	0.0	84	0	0
B0256-1	410	96	4.1		25.2				62.5		8.2	0.0	84	0	0
B0257-12	332	90	9.0		30.0				54.6		5.6	0.7	80	0	0
B0257-3	391	90	10.2		31.6				54.3		3.9	0.0	87	0	0
B0257-8	260	84	16.1		47.4				34.9		1.6	0.0	89	1	1
B0257-9	359	96	2.7		18.0				61.1		17.2	0.9	79	1	0
B0347-4	312	94	5.7		24.6				62.9		6.7	0.0	77	0	1
B0386-9	340	94	6.4		40.7				47.5		5.4	0.0	75	0	0
B0405-4	259	88	12.5		51.3				36.2		0.0	0.0	81	0	0
B0405-6	351	89	11.5		52.1				36.4		0.0	0.0	70	0	0
Kennebec	437	94	4.6		21.5				59.8		13.0	1.0	67	0	0
Monona	359	93	6.2		22.9				56.6		13.0	1.3	62	0	1
LSD (.05)	67														05

^{1,2,3} See Table 1.

Table 5 (continued)

Temperature Date	50°F		45°F		40°F		40°-70°F		50°F		45°F	
	1/10	1/10	1/24	1/24	1/22	1/22	1/30	1/30	2/5	2/5	2/7	2/7
Pedigree	Chip ⁴	spt ⁵	chip	spt	chip	spt	chip	spt	chip	spt	chip	spt
Atlantic	7.9	S	9.1	S	9.1	S	8.2	M	9.3	M	8.9	S
B0246-4	8.6	O	9.6	O	9.9	O	8.2	S	9.2	S	9.1	S
B0246-6	7.1	L	8.8	L	8.3	L	7.8	L	7.9	VL	7.8	VL
B0246-7	8.0	L	9.6	L	9.5	M	8.9	L	8.8	VL	9.1	VL
B0246-8	7.3	L	8.4	L	8.8	L	8.0	L	7.6	VL	8.1	VL
B0255-5	9.0	M	9.9	M	9.7	M	9.0	M	9.6	M	9.7	M
B0255-9	7.9	S	9.0	S	9.1	O	8.1	M	8.1	M	8.5	M
B0256-1	9.8	M	10.0	M	10.0	S	9.4	M	10.0	M	9.6	M
B0257-12	7.5	M	8.8	M	8.5	S	8.7	M	8.7	L	8.5	M
B0257-3	7.2	S	8.1	S	8.2	S	7.1	S	7.4	M	7.3	M
B0257-8	6.4	S	7.3	S	7.4	S	7.5	S	7.0	M	7.2	S
B0257-9	7.2	S	7.8	S	8.0	S	7.9	M	7.8	M	7.4	M
B0347-4	7.9	S	8.8	S	9.5	O	9.0	S	8.4	S	8.6	S
B0386-9	8.5	VL	9.7	VL	9.7	VL	9.3	VL	9.0	VL	9.6	VL
B0405-4	6.7	M	7.9	M	7.7	M	7.4	M	7.5	L	6.9	M
B0405-6	8.5	M	10.0	M	9.9	M	9.5	M	9.6	M	9.4	L
Kennebec	8.6	O	9.6	O	9.5	O	9.1	S	9.5	S	9.5	S
Monona	6.6	S	8.4	S	8.1	M	7.3	S	7.1	M	7.6	S

⁴Chips: 1-7 = satisfactory

⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 5 (continued)

Temperature Date	40°F 2/19	40°-70°F 2/20	45°F 3/8	40°F 3/5	40°-70°F 3/22	
Pedigree	chip ⁴	spt ⁵	chip	spt	chip	spt
Atlantic	8.9	S	7.6	S	9.0	VL
B0246-4	9.5	S	8.0	S	9.4	M
B0246-6	9.0	VL	7.6	M	8.7	VL
B0246-7	9.6	L	7.9	M	8.7	VL
B0246-8	8.8	L	8.0	M	8.3	VL
B0255-5	9.8	M	8.4	M	9.5	VL
B0255-9	9.4	S	7.4	S	8.8	M
B0256-1	9.9	M	9.2	M	9.4	L
B0257-12	8.8	M	8.5	M	8.5	VL
B0257-3	8.3	S	6.8	M	7.9	VL
B0257-8	7.6	S	7.5	S	7.8	L
B0257-9	8.3	S	8.2	S	7.3	VL
B0347-4	8.8	S	9.0	S	8.6	M
B0386-9	9.4	VL	8.5	L	9.2	VL
B0405-4	8.0	M	7.3	M	7.8	VL
B0405-6	9.7	L	8.9	M	9.5	VL
Kennebec	9.3	S	9.0	S	9.3	M
Monona	8.2	S	7.6	S	7.7	L
					9.5	S
					9.6	O
					9.4	L
					9.6	M
					8.8	VL
					9.8	M
					9.1	S
					10.0	M
					9.0	S
					9.7	M
					9.3	VL
					9.0	S
					8.4	L
					9.0	VL
					9.2	M
					8.3	M
					7.9	M
					7.2	M
					9.3	VL
					9.0	S
					10.0	M
					9.9	VL
					9.7	O
					8.8	S
					7.7	S

⁴Chips: 1-7 = Satisfactory⁵Sprout length:

0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 6. Yield, tuber size distribution, and quality characteristics of russets harvested 117 days after planting at Echo Lake in 1990.

Pedigree	Mkt CWT/A	%Mkt	Tuber Size Distribution					SG ¹	HH ²	IN ³
			<2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			
B0169-56	316	88	12.1	35.4	38.9	13.5	0.0	74	0	0
B0180-18	220	93	5.9	28.7	43.6	21.1	0.7	65	0	0
B0180-31	180	81	18.6	43.5	22.4	14.7	0.7	76	0	0
B0180-39	276	90	2.1	20.5	35.1	34.4	7.9	67	1	0
B0184-15	246	89	11.0	56.2	25.7	7.0	0.0	75	0	0
B0184-16	185	81	18.7	51.4	24.1	5.9	0.0	73	0	0
B0184-30	300	90	7.4	35.2	47.0	8.3	2.1	81	7	0
B0186-1	303	93	3.0	16.2	54.9	22.1	3.7	79	1	0
B0186-11	291	89	9.1	35.2	34.5	19.6	1.2	73	0	0
B0186-16	281	90	8.3	32.1	38.8	18.8	2.0	85	0	0
B0186-23	278	89	10.3	37.7	39.9	11.0	1.0	89	16	0
B0186-3	254	83	16.9	51.0	24.1	8.0	0.0	84	0	0
B0190-13	306	92	6.7	36.5	37.3	18.5	1.0	76	0	0
B0190-9	321	92	4.8	21.6	42.8	27.8	3.0	72	2	0
B9922-11	270	93	4.3	25.1	45.8	22.0	2.8	79	2	0
BelRus	266	91	8.9	43.5	36.2	11.5	0.0	78	0	0
Coastal Russet	302	85	14.8	61.5	16.8	7.0	0.0	70	0	0
Russet Burbank	266	74	25.9	47.9	15.2	11.0	0.0	69	0	0
LSD (.05)	48							03		

^{1,2,3} See Table 1.

BARC Table 6 (continued)

Temperature Date	50°F		45°F		40°F		40°-70°F		50°F		45°F	
	1/14	spt ⁵	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt
Pedigree	Fry ⁴	spt ⁵	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt
B0169-56	3.8	M	4.2	M	5.0	S	4.7	M	4.4	VL	4.3	M
B0180-18	3.0	S	3.8	S	4.6	O	3.0	S	3.4	M	4.1	S
B0180-31	3.6	S	3.4	S	4.1	O	2.7	S	3.5	L	3.2	S
B0180-39	2.9	M	3.1	S	4.3	O	2.4	S	2.7	L	2.7	S
B0184-15	2.9	M	3.3	S	4.3	O	2.8	S	3.5	M	3.3	M
B0184-16	2.9	S	3.1	S	4.7	O	3.5	S	3.2	M	3.1	S
B0184-30	3.4	M	3.8	S	4.7	O	3.1	M	3.9	VL	3.9	S
B0186-1	2.8	M	2.8	M	4.2	S	2.6	S	2.8	L	2.9	L
B0186-11	3.0	S	3.5	S	4.4	O	2.6	S	3.5	M	3.6	S
B0186-16	2.8	S	3.4	S	4.4	O	3.1	S	3.5	L	3.4	S
B0186-23	2.9	M	3.0	M	3.8	S	3.0	S	3.0	M	2.7	M
B0186-3	2.6	M	2.5	S	3.5	O	2.6	S	2.7	M	2.4	M
B0190-13	2.4	S	2.4	S	3.4	O	2.2	S	2.6	M	2.7	S
B0190-9	3.2	S	4.1	S	5.0	O	2.7	S	4.1	M	3.7	S
B9922-11	2.9	S	3.6	O	5.0	O	2.8	S	3.6	M	3.8	S
BelRus	3.4	S	4.4	S	4.9	O	4.0	S	3.9	L	4.0	S
Coastal Russet	5.0	M	5.0	S	5.0	O	5.0	M	5.0	L	5.0	S
Russet Burbank	4.1	S	4.3	O	4.9	O	4.0	S	4.2	O	4.3	O

⁴Fry: 1-3 = Satisfactory⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 6 (continued)

Temperature Date	40°F 2/19	40°-70°F 2/21	45°F 3/12	40°F 3/5	40°-70°F 3/22					
Pedigree	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt				
B0169-56	5.0	M	4.2	L	4.6	VL	5.0	S	5.0	VL
B0180-18	4.1	S	3.0	S	3.8	M	4.5	S	2.7	M
B0180-31	3.7	S	3.4	M	3.5	M	4.1	S	3.6	L
B0180-39	3.7	S	2.4	S	3.0	VL	3.9	S	2.6	L
B0184-15	4.3	S	3.4	M	3.9	L	4.3	S	3.3	M
B0184-16	3.7	S	3.4	S	3.6	M	4.3	O	3.4	M
B0184-30	4.3	S	3.4	M	4.0	VL	4.2	S	3.8	VL
B0186-1	3.4	M	3.0	M	3.1	VL	3.9	M	3.2	VL
B0186-11	4.0	S	3.0	S	3.7	M	4.2	S	3.2	M
B0186-16	4.1	S	3.3	M	3.9	M	4.2	S	3.4	L
B0186-23	3.4	M	2.6	L	3.3	L	3.6	L	3.0	L
B0186-3	3.1	S	2.4	M	2.9	L	3.7	S	2.7	M
B0190-13	2.7	S	2.7	S	2.8	M	2.9	S	2.9	M
B0190-9	4.6	S	3.1	M	4.3	M	4.4	O	3.3	M
B9922-11	4.1	S	3.2	S	4.2	M	4.8	O	3.2	M
BelRus	4.4	S	4.0	M	4.3	VL	4.6	S	3.9	VL
Coastal Russet	5.0	S	4.9	L	5.0	M	5.0	S	5.0	VL
Russet Burbank	4.4	O	4.1	S	4.5	O	4.9	O	4.5	S

⁴Fry: 1-3 = satisfactory

⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 7. Yield, tuber size distribution, and quality characteristics of russets harvested 117 days after planting at Echo Lake in 1990.

Pedigree	Mkt CWT/A	%Mkt	Tuber Size Distribution					SG ¹	HH ²	IN ³
			<2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			
B0220-14	252	92	4.0	19.7	48.4	23.6	4.3	75	0	0
B0251-5	338	91	7.6	30.2	45.9	14.4	1.9	80	1	0
B0303-30	251	91	6.1	28.5	43.7	18.8	2.9	72	0	0
B0303-46	277	84	12.5	40.5	33.2	10.5	3.4	77	0	0
B0306-6	318	92	6.5	41.3	32.9	17.4	1.9	77	1	0
B0309-11	212	90	6.9	34.2	41.2	15.1	2.6	86	0	0
B0310-11	272	86	5.2	25.9	40.0	20.0	8.9	80	1	0
B0311-12	220	88	12.4	48.9	34.2	4.5	0.0	79	0	0
B0311-2	340	89	7.5	24.4	42.5	22.5	3.2	80	1	0
B0312-10	265	87	8.9	36.6	38.6	11.8	4.2	77	0	0
B0315-17	313	91	6.8	34.4	47.1	9.7	2.0	71	0	0
B0315-4	271	91	9.4	38.6	35.9	16.1	0.0	77	0	0
B0316-19	285	87	5.1	33.4	33.8	20.2	7.4	76	0	0
B0316-36	283	86	13.6	53.2	25.2	7.9	0.0	83	1	0
B0317-18	282	89	10.6	39.5	38.0	11.4	0.5	78	0	0
NemaRus	263	88	9.4	39.7	40.7	7.4	2.8	69	0	0
Russet Burbank	223	68	32.5	44.3	15.6	7.6	0.0	70	0	0
Russette	294	91	8.6	39.4	46.9	4.5	0.5	77	0	0
LSD (.05)	48							02		

1,2,3 See Table 1.

BARC Table 7 (continued)

Temperature Date	50°F 1/14	45°F 1/24	40°F 1/22	40°-70°F 1/17	50°F 2/4	45°F 2/8
Pedigree	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt
B0220-14	2.5	M	2.7	S	3.0	L
B0251-5	2.9	M	3.4	S	3.0	VL
B0303-30	3.9	S	4.2	S	4.0	M
B0303-46	3.5	VL	3.9	M	3.4	VL
B0306-6	3.4	M	4.1	S	4.2	M
B0309-11	2.3	M	2.9	S	3.0	M
B0310-11	2.3	L	2.5	M	3.0	VL
B0311-12	3.3	L	3.3	M	3.4	VL
B0311-2	3.6	S	4.0	O	3.9	M
B0312-10	2.3	M	2.9	S	2.8	M
B0315-17	3.6	S	4.4	S	4.0	L
B0315-4	2.4	L	3.2	S	2.7	VL
B0316-19	4.8	O	5.0	S	5.0	O
B0316-36	3.1	M	3.7	S	3.4	M
B0317-18	3.3	M	3.8	S	3.7	VL
NemaRus	3.2	M	3.9	S	3.6	L
Russet Burbank	4.5	O	4.5	O	4.6	O
Russette	3.8	S	4.3	S	4.3	M

⁴Fry: 1-3 = Satisfactory

⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 7 (continued)

Temperature Date	40°F 2/19	40°-70°F 2/21	45°F 3/12	40°F 3/5	40°-70°F 3/22	
Pedigree	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt
B0220-14	2.7	S	2.6	M	3.5	VL
B0251-5	3.2	S	2.3	M	3.5	VL
B0303-30	4.2	S	3.9	M	4.4	L
B0303-46	4.2	M	3.3	L	4.1	VL
B0306-6	4.3	M	4.3	M	4.1	L
B0309-11	3.0	M	2.5	M	3.0	L
B0310-11	3.0	M	2.9	M	3.2	VL
B0311-12	3.8	M	3.0	L	3.7	VL
B0311-2	4.4	S	3.4	M	4.0	M
B0312-10	3.2	S	2.6	M	3.0	VL
B0315-17	4.0	S	3.2	M	4.2	L
B0315-4	3.4	M	2.6	M	3.1	VL
B0316-19	5.0	S	5.0	S	5.0	S
B0316-36	3.5	S	2.7	S	4.0	L
B0317-18	4.4	S	3.6	M	4.3	L
NemaRus	4.3	S	3.5	M	4.0	L
Russet Burbank	4.4	O	4.5	S	4.6	S
Russette	4.4	S	3.5	M	4.2	M

⁴Fry:

1-3 = Satisfactory

⁵Sprout length:

0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 8. Yield, tuber size distribution, and quality characteristics of russets harvested 113 days after planting at Echo Lake in 1990.

Pedigree	Mkt CWT/A	%Mkt	Tuber Size Distribution					SG ¹	HH ²	IN ³
			<2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			
B0319-4	255	91	9.3	52.7	30.8	7.3	0.0	74	1	0
B0324-25	272	89	9.3	40.8	38.0	10.3	1.6	77	0	0
B0324-5	171	89	10.2	55.8	22.4	10.8	0.8	79	0	0
B0326-15	183	87	13.3	57.0	25.7	4.0	0.0	87	0	0
B0327-9	159	72	27.7	61.1	9.5	1.7	0.0	83	0	0
B0328-2	166	68	32.4	59.2	7.5	0.9	0.0	86	0	2
B0328-7	230	84	16.3	62.1	18.3	3.2	0.0	76	0	1
B0329-1	297	90	7.9	38.8	39.7	11.9	1.7	78	0	1
B0329-10	212	78	22.4	61.2	10.9	5.4	0.0	85	0	0
B0330-39	183	82	17.6	58.1	18.4	5.8	0.0	79	0	0
B0332-13	279	89	11.3	53.7	25.4	9.6	0.0	79	0	0
B0334-23	186	72	27.8	53.6	15.5	3.1	0.0	76	0	1
B0336-5	131	63	37.3	52.1	8.2	2.4	0.0	78	0	0
B0338-2	163	77	23.2	55.4	13.9	7.5	0.0	74	1	0
B0338-5	301	97	3.3	28.9	56.1	11.8	0.0	76	0	10
B0338-6	278	89	11.3	51.9	26.9	9.9	0.0	76	0	0
BelRus	222	86	14.4	51.3	30.5	3.8	0.0	80	0	0
Russet Burbank	195	64	35.7	46.4	11.5	5.7	0.7	72	0	1
LSD (.05)	50							03		

1,2,3 See Table 1.

BARC Table 8 (continued)

Temperature Date	50°F 1/15	45°F 1/25	40°F 1/22	40°-70°F 1/17	50°F 2/5	45°F 2/8
Pedigree	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt
B0319-4	2.7	S	3.1	S	2.8	M
B0324-25	3.3	M	4.0	S	3.2	L
B0324-5	2.3	M	2.4	M	2.5	M
B0326-15	2.8	M	2.5	S	3.1	L
B0327-9	3.4	M	4.0	S	3.7	L
B0328-2	4.2	L	4.6	L	4.4	VL
B0328-7	3.2	O	3.6	O	3.3	S
B0329-1	4.2	M	4.7	M	4.1	M
B0329-10	3.0	S	3.1	S	3.6	S
B0330-39	2.5	M	2.9	S	2.8	M
B0332-13	3.7	S	3.6	S	4.0	M
B0334-23	3.7	M	4.0	M	4.0	VL
B0336-5	3.4	M	3.3	M	3.2	M
B0338-2	3.6	S	4.3	S	3.8	S
B0338-5	3.5	O	4.0	S	3.9	S
B0338-6	3.9	S	4.2	S	4.4	S
BelRus	3.9	S	4.1	S	4.6	S
Russet Burbank	4.7	O	4.5	O	4.4	O

⁴Fry: 1-3 = Satisfactory⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 8 (continued)

Temperature Date	40°F 2/25	40°-70°F 2/21	45°F 3/12	40°F 3/6	40°-70°F 3/25					
Pedigree	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt				
B0319-4	3.2	S	2.4	M	3.0	M	3.4	S	2.6	M
B0324-25	4.0	M	3.3	M	3.9	VL	4.1	S	3.5	VL
B0324-5	2.9	M	2.2	M	2.3	VL	3.1	L	2.4	VL
B0326-15	3.0	S	3.0	M	2.5	VL	3.0	S	2.7	L
B0327-9	4.4	M	3.4	M	4.0	VL	4.6	S	3.3	M
B0328-2	4.6	VL	4.5	VL	4.3	VL	4.7	VL	4.2	VL
B0328-7	3.8	O	3.7	M	3.7	S	3.7	O	3.8	M
B0329-1	4.5	M	3.4	M	4.5	L	4.5	M	3.3	L
B0329-10	3.7	O	2.9	S	3.2	S	4.0	O	2.7	M
B0330-39	2.9	M	2.7	S	2.6	M	3.5	S	2.9	M
B0332-13	4.1	S	3.4	M	4.1	M	4.2	S	3.5	L
B0334-23	4.2	L	3.5	VL	4.3	VL	4.4	L	3.7	VL
B0336-5	3.5	M	2.9	M	3.2	VL	3.7	L	3.3	L
B0338-2	4.7	S	4.4	M	4.5	M	4.8	S	4.5	M
B0338-5	4.4	S	3.5	S	4.0	S	4.5	O	3.7	M
B0338-6	4.6	S	4.1	M	4.3	L	4.6	S	4.7	VL
BelRus	4.6	S	4.1	S	4.1	L	4.4	S	4.2	L
Russet Burbank	4.6	O	4.2	S	4.2	S	4.6	O	4.2	M

1-3 = Satisfactory

5Sprout length: 0 = no sprouts.

$$S = <0.5''$$
$$M = 0.5-1.5''$$
$$L = 1.5 - 2.5''$$
$$VL = >2.5''$$

BARC Table 9. Yield, tuber size distribution, and quality characteristics of russets harvested 113 days after planting at Echo Lake in 1990.

Pedigree	Mkt CWT/A	%Mkt	Tuber Size Distribution					SG ¹	HH ²	IN ³
			<2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			
B0338-17	247	80	19.2	47.6	19.8	12.7	0.6	83	4	3
B0338-18	259	81	19.4	54.9	20.3	5.3	0.0	78	0	0
B0338-9	217	81	18.8	50.2	26.5	4.5	0.0	82	0	0
B0339-1	318	91	5.6	34.8	41.6	14.6	3.4	73	1	3
B0339-16	168	68	31.8	53.9	9.8	4.5	0.0	80	0	0
B0339-17	291	89	9.3	50.1	25.9	13.1	1.6	74	0	2
B0344-12	177	70	30.4	55.9	9.9	3.8	0.0	78	0	0
B0348-2	289	94	4.3	18.2	51.0	25.3	1.3	82	0	0
B0352-17	259	82	17.6	48.3	31.1	3.1	0.0	80	0	0
B0362-1	221	88	9.2	44.5	34.2	9.6	2.5	87	0	0
B0362-2	217	86	13.1	39.8	35.9	9.9	1.4	90	0	0
B0367-6	178	72	27.5	59.2	11.9	1.4	0.0	80	0	0
B0369-13	220	90	10.0	56.0	24.6	9.4	0.0	86	0	3
B0384-4	154	82	17.7	45.8	31.8	4.8	0.0	78	0	0
B0425-5	276	92	5.0	30.3	41.2	20.4	3.0	73	0	0
BelRus	233	86	13.5	50.6	30.3	5.6	0.0	82	0	0
Coastal Russet	281	84	16.4	67.0	13.4	3.2	0.0	73	0	0
Russet Burbank	237	70	29.5	44.4	15.4	10.7	0.0	72	0	1
LSD (.05)	52							03		

^{1,2,3} See Table 1.

BARC Table 9 (continued)

Temperature Date	50°F 1/15	45°F 1/25	40°F 1/28	40°-70°F 1/18	50°F 2/6	45°F 2/11
Pedigree	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt
B0338-17	3.2	M	3.3	S	3.9	O
B0338-18	4.0	M	4.1	S	4.7	O
B0338-9	3.9	M	4.0	M	4.9	O
B0339-1	3.3	M	3.0	S	4.2	O
B0339-16	3.2	S	3.3	S	4.6	O
B0339-17	3.8	M	4.3	S	4.9	O
B0344-12	2.5	L	2.6	M	3.3	S
B0348-2	4.1	M	4.7	M	5.0	S
B0352-17	4.8	S	5.0	S	5.0	O
B0362-1	3.0	M	3.6	M	4.7	S
B0362-2	2.4	L	3.2	M	3.5	O
B0367-6	2.6	L	2.9	M	3.9	O
B0369-13	3.1	M	3.7	S	4.6	O
B0384-4	2.9	L	3.2	S	3.8	S
B0425-5	2.5	M	3.1	M	4.1	S
BelRus	3.7	S	4.1	S	4.4	O
Coastal Russet	5.0	M	5.0	S	5.0	O
Russet Burbank	4.3	O	4.6	O	4.7	O

⁴Fry: 1-3 = Satisfactory

⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 9 (continued)

Temperature Date	40°F		40°-70°F		45°F		40°F		40°-70°F	
	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt
Pedigree										
B0338-17	3.1	S	3.2	L	3.0	L	3.5	S	3.6	VL
B0338-18	4.6	S	4.0	L	4.3	L	4.7	S	4.4	VL
B0338-9	4.1	S	4.2	M	3.9	VL	4.2	S	4.2	L
B0339-1	3.8	M	3.9	L	3.6	L	4.0	S	4.0	VL
B0339-16	3.7	S	3.5	M	3.7	L	4.2	S	3.9	VL
B0339-17	4.5	S	4.0	M	4.1	M	5.0	S	4.1	M
B0344-12	2.9	L	2.9	VL	2.6	VL	3.2	M	3.1	VL
B0348-2	4.8	L	4.7	L	4.9	VL	5.0	M	4.6	VL
B0352-17	5.0	S	5.0	M	4.9	M	5.0	S	5.0	L
B0362-1	4.1	VL	3.3	VL	3.7	VL	4.1	L	3.2	VL
B0362-2	3.0	VL	2.4	L	2.5	VL	3.4	M	2.5	VL
B0367-6	3.3	L	2.8	VL	3.1	VL	3.6	M	2.8	VL
B0369-13	4.1	S	2.7	M	3.8	M	4.3	S	3.3	VL
B0384-4	3.8	M	3.0	M	3.6	VL	3.7	S	2.9	L
B0425-5	3.5	L	2.6	L	3.5	VL	4.2	M	3.1	VL
BelRus	4.6	S	4.2	M	4.1	VL	4.5	S	4.2	VL
Coastal Russet	5.0	S	4.9	L	5.0	S	5.0	S	5.0	L
Russet Burbank	4.6	O	4.4	S	4.4	O	4.4	O	4.3	S

⁴Fry: 1-3 = Satisfactory⁵Sprout length:

0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 10. Yield, tuber size distribution, and quality characteristics of russets harvested 113 days after planting at Echo Lake in 1990.

Pedigree	Mkt		Tuber Size Distribution							SG ¹	HH ²	IN ³
	CWT/A	%Mkt	<2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz					
B0427-7	195	75	25.0	49.7	22.4	2.8	0.0	75	0	0		
B0440-27	261	82	18.0	55.2	26.9	0.0	0.0	75	0	0		
B0455-27	223	88	10.8	43.8	38.8	5.9	0.7	75	1	0		
B0455-8	231	94	5.6	35.0	49.9	9.5	0.0	76	0	0		
B0478-25	162	78	22.4	53.4	20.5	3.7	0.0	83	0	0		
B0479-3	170	77	23.4	57.6	17.8	1.2	0.0	83	0	0		
B0486-1	135	71	29.1	58.7	11.1	1.1	0.0	77	0	0		
B0493-8	323	92	4.3	18.3	53.6	20.3	3.6	73	0	0		
B0502-17	191	89	9.9	43.1	34.4	11.8	0.7	86	1	0		
B0502-22	192	82	18.1	50.0	30.9	1.0	0.0	85	0	0		
B0524-9	223	84	16.2	41.6	36.5	5.7	0.0	78	0	0		
B0647-1	225	89	8.2	47.8	35.4	5.5	3.1	74	0	0		
B0649-5	190	84	16.5	59.5	20.8	3.2	0.0	73	0	0		
B0651-3	315	87	9.7	37.8	36.4	12.2	3.8	68	0	0		
B0653-8	212	86	13.8	53.0	26.3	6.3	0.6	74	0	0		
Coastal Russet	227	81	19.2	67.8	13.0	0.0	0.0	66	0	0		
Russet Burbank	166	59	40.6	44.7	12.5	2.2	0.0	73	0	0		
Russette	247	85	15.4	46.9	36.4	1.3	0.0	78	0	0		
LSD (.05)	37											

1,2,3 See Table 1.

BARC Table 10 (continued)

Temperature Date	50°F 1/15	45°F 1/25	40°F 1/28	40°-70°F 1/18	50°F 2/5	45°F 2/11
Pedigree	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt
B0427-7	2.8	M	2.9	L	3.3	S
B0440-27	3.3	M	3.0	S	3.9	O
B0455-27	4.2	S	4.2	S	5.0	O
B0455-8	3.4	S	4.0	S	4.8	O
B0478-25	3.4	M	3.0	S	4.1	O
B0479-3	3.5	S	4.0	S	4.4	O
B0486-1	3.8	M	4.1	M	4.2	O
B0493-8	4.6	M	4.9	M	5.0	S
B0502-17	2.4	O	2.9	O	3.7	O
B0502-22	3.1	S	2.7	S	3.4	O
B0524-9	2.9	M	3.1	S	3.7	S
B0647-1	3.0	S	2.9	S	3.7	S
B0649-5	3.3	S	3.9	S	4.0	O
B0651-3	3.0	M	2.7	S	3.4	S
B0653-8	3.3	S	3.7	S	4.3	O
Coastal Russet	5.0	M	5.0	S	5.0	S
Russet Burbank	4.3	S	4.1	O	4.9	O
Russette	4.2	S	4.4	S	4.2	O
					3.9	S
					4.1	L
					4.8	L
					3.0	S
					2.7	S
					3.5	M
					4.6	S
					3.8	M
					3.7	L
					3.6	M
					3.8	VL
					4.9	VL
					2.7	S
					3.0	S
					3.0	M
					3.5	L
					3.7	S
					3.5	L
					3.9	S
					5.0	M
					4.4	O
					4.1	L
					4.3	S
					3.0	L
					3.5	S
					4.6	S
					4.3	S
					3.6	M
					4.8	S
					3.9	M
					4.8	L
					3.0	S
					2.9	S
					3.2	M
					3.2	M
					3.8	S
					2.8	M
					4.0	S
					5.0	S
					4.1	O
					4.3	S
					4.3	S

⁴Fry: 1-3 = Satisfactory⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 10 (continued)

Temperature Date	40°F 2/25	40°-70°F 2/22	45°F 3/4	40°F 3/6	40°-70°F 3/26	
Pedigree	Fry ⁴	Spt ⁵	Fry	Spt	Fry	Spt
B0427-7	3.1	L	2.8	L	3.9	M
B0440-27	3.8	S	3.6	S	3.9	S
B0455-27	4.8	S	4.1	S	5.0	S
B0455-8	4.4	S	3.3	M	4.8	S
B0478-25	4.2	M	3.3	M	4.7	M
B0479-3	4.0	S	2.9	S	4.5	O
B0486-1	4.1	M	3.9	VL	4.3	M
B0493-8	4.9	L	4.6	VL	5.0	L
B0502-17	3.4	S	2.4	S	3.6	S
B0502-22	3.2	S	2.3	S	3.5	O
B0524-9	3.6	M	2.9	M	4.0	M
B0647-1	3.6	M	3.2	VL	3.8	S
B0649-5	3.7	S	3.2	M	3.8	S
B0651-3	2.7	M	2.8	M	3.8	S
B0653-8	4.1	S	3.3	M	4.0	S
Coastal Russet	5.0	S	4.8	VL	5.0	S
Russet Burbank	4.4	O	4.0	S	4.7	O
Russette	4.4	S	3.5	M	4.5	S

⁴Fry: 1-3 = Satisfactory

⁵Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

D. L. Corsini and J. J. Pavek
Aberdeen, Idaho

The 1990 breeding effort continued at about the level of 1989. At Aberdeen, 653 4X and 108 2X crosses were made and tubers of 100,000 seedlings of 342 crosses were produced in the greenhouses. The first-size tubers were grown as spaced plants at Aberdeen and the second- and third-size were distributed to cooperators in Oregon, California, Colorado, Texas, and North Dakota. Ninety-five other crosses were also grown out in Oregon by Al Mosley.

- Yield trials: Yield trials with 371 preliminary to advanced selections were conducted at one or two Idaho locations. About 75% of the selections were long russets for processing and the rest were chippers, diseases resistant or otherwise interesting selections, and various diploids. Emphasis was placed on french frying and chipping out of long-term storage with added emphasis on frying and chipping out of cold storage (40°F).
- Seed Increase: Virus indexed seed of 296 clones at Aberdeen and 141 clones at Tetonia was produced. In addition non-indexed seed of 306 early generation clones was also produced in tuber units at Aberdeen. Seed of these clones was used in our own and in various cooperator trials.
- Disease and Storage Rot Evaluations: Eleven named varieties and 26 advanced breeding selections were evaluated for resistance to *Verticillium* wilt, early blight, common scab, and leafroll net necrosis under typical field conditions in southern Idaho and to bacterial soft-rot and *Fusarium* dry rot under controlled conditions. Most clones selected in the West (A, AC, AO, CO, NDA, NDO numbers) had moderate to high resistance to *Verticillium* wilt and early blight compared with commonly grown varieties (see ARS TABLE 1). The soon-to-be-released selection A74212-1 (Century Russet) has particularly good *Verticillium* resistance. Although common scab was not severe at either site this year, selections with readings of 1 can be considered susceptible and with 2 very susceptible. Most clones were susceptible to soft rot, however, a few potential varieties such as ND1538-1 and C008014-1 showed some resistance.
- Releases: "Frontier Russet" (A74114-4) was released (April 1990) for early processing and fresh packing. "Ranger Russet" (A7411-2) is being released in 1991 as a processing and fresh-pack russet. Both are well adapted to irrigated agriculture.
- Germplasm development: We continued to develop germplasm with resistance to (1) storage rots, (2) viruses PVX, PVY, AND PLRV, (3) blackspot bruise, and (4) *Verticillium* wilt, including novel sources such as S. chacoense.

ARS Table 1. Evaluation of potato breeding selections and cultivars for resistance to field and storage diseases, 1990.

Cultivar or Breeding Selection	Verticillium ¹ Wilt	Early ² Blight	Common ³ Scab	Bacterial ⁴ Soft-rot	Fusarium Dry rot ⁵ FS FC	Tuber Early Blight ⁶	Leafroll Net Necrosis ⁷ at 50 F	Sprouting at 50 F	Dessication at 50 F
<u>Regional Yield Trial</u>									
AC77101-1	5.4	6.2	0.1	2.6	4.6	2.4	1.9	0.9	3
AC7869-17	4.6	4.3	0	1.7	3.6	1.8	1.9	0.8	2
AC81198-1	4.4	3.3	0	2.7	4.1	2.1	1.2	0.6	3
A082611-7	3.5	3.5	0	--	4.0	2.2	1.5	0.3	4
BC0038-1	7.1	7.4	0.1	3.2	3.4	2.2	1.1	1.0	4
C07918-11	4.8	5.2	2.2	2.6	4.3	1.2	1.0	1.3	3
C08011-5	5.4	6.0	0	2.2	4.4	2.7	1.0	0.8	4
NDTX8-731-1R	5.0	8.0	0.5	1.5	4.6	3.7	0.7	1.2	5
ND1538-1RUS	7.0	4.4	0	1.0	2.1	2.3	1.0	0.9	5
ND671-4RUS	9.0	8.8	0	2.8	3.2	1.5	1.6	0.6	3
C082141-4	3.8	3.5	1.1	1.7	4.5	3.1	2.4	1.3	4
<u>Tri-State Trial</u>									
A81323-6	4.6	5.0	0.1	2.3	4.6	1.4	0.3	2.1	3
A81473-2	2.5	2.8	0	3.8	3.8	1.8	1.7	0.4	2
A81727-6	4.3	5.4	0.2	2.1	3.1	1.6	1.6	0.2	4
A82119-3	3.8	3.0	0.1	3.0	4.6	1.4	1.3	0.9	4
<u>Chipping Trial</u>									
NDA2031-2	3.2	4.2	1.1	2.6	4.5	1.3	1.1	1.2	4
ND01496-1	4.7	5.8	0.8	3.4	3.9	1.2	1.0	0.4	5
AC83306-1	3.2	4.8	0.1	2.8	4.3	1.2	1.6	1.0	3
ND2008-1	9.0	9.0	0.1	3.5	4.0	2.7	1.0	0.4	4
A80559-2	2.8	4.2	0.1	2.5	4.4	2.2	1.2	0.6	3
NDA2126-6	4.7	4.6	0.4	3.4	4.5	1.5	1.2	1.1	4
AC80545-1	3.5	3.4	0.1	2.9	4.0	1.2	1.1	0.2	2
<u>Miscellaneous Selections</u>									
A7411-2 (Ranger Russet)	5.0	4.6	0.5	1.4	2.2	2.3	1.1	0.9	4
A74212-1(Century Russet)	3.8	5.0	0.1	1.7	4.3	1.8	2.0	2.2	3
NDTX9-1068-11R	4.5	5.2	0.4	4.1	4.6	3.3	3.6	1.2	4
C008014-1	5.8	5.4	0	1.2	4.1	1.3	0.9	0.6	4

ARS Table 1 cont. Evaluation of potato breeding selections and cultivars for resistance to field and storage diseases, 1990.

Cultivar or Breeding Selection	Verticillium ¹		Early ² Blight	Common ³ Scab	Bacterial ⁴ Soft-rot	Fusarium		Tuber Early Blight ⁶	Leafroll		Sprouting at 50 F	Dessication at 50 F
	Wilt					Dry rot ⁵ FS	FC		Net Necrosis ⁷			
Variety												
Atlantic	5.0		4.5	0.3	2.7	4.0	2.1	1.5	0.7	5		3
Frontier Russet	5.9		4.9	0	2.0	3.4	1.4	2.1	0.8	2		2
Gemchip	3.7		4.8	0.2	3.0	2.3	1.8	2.2	0.7	3		3
HiLite	9.0		9.0	0	3.4	2.3	1.6	2.4	0.4	3		2
Norchip	5.2		6.5	0.1	3.2	3.4	1.9	1.3	0.9	5		4
NorKing Russet	6.5		8.4	0	2.0	4.9	1.3	0.8	1.3	4		3
Red LaSoda	4.4		5.2	0.9	2.7	2.8	2.5	1.9	1.7	4		3
Russet Burbank	6.8		6.0	0	2.3	4.9	2.5	2.1	1.2	1		2
Russet Norkotah	9.0		8.8	0.1	2.8	3.0	2.0	0.7	0.7	4		3
Shasta	4.8		4.8	1.2	2.9	4.6	1.7	3.2	0.8	4		3
Shepody	4.3		6.0	0.5	2.5	3.1	1.6	0.7	1.1	3		2
LSD @5%	1.7		1.7	0.6	1.4	0.7	0.7	0.9	--	1		1

1 Verticillium wilt 0 to 9 scale: 0 = none; 9 = >90% stems in plot dead or dying with typical Verticillium wilt symptoms; 2 locations; final evaluation 28 Aug 1990.

2 Early blight 0-9 scale: 0 = none to 9 = >90% leaflets in plot with severe blight lesions or necrosis due to early blight; 2 locations; final evaluations 28 Aug 1990.

3 Common scab 0 to 5 scale: 0 = none to 5 = all tubers in plot unmarketable due to scab, and scab lesions severely pitted.

4 Bacterial soft-rot, 0 to 5 scale: 0 = none to 5 = all tubers showing severe soft rot after 1 week incubation in mist chamber.

5 Fusarium dry rot 0 to 5 scale: 0 = None to 5 = all tubers showing severe dry rot after 2 months incubation at 50 F, *F. sambucinum* and *F. coeruleum*.

6 Tuber early blight 0 to 5 scale: 0 = None to 5 = all tubers showing >10% coverage and deep penetration.

7 Leafroll Net Necrosis 0 to 5 scale: 0 = None to 5 = all tubers showing deep penetration of net necrosis symptoms.

8 Sprouting and dessication after 5 month storage at 50 F: 1 = least to 5 = most.

INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)

J.B. Bamberg

Introduction of New Stocks

Dr. Spooner participated in a collecting expedition to Argentina and Chile this spring. New acquisitions for the year included 20 accessions of non-tuber-bearing species from Dr. Spooner's 1990 Chile expedition, one accession from Dr. Spooner's 1988 Mexico expedition, 42 miscellaneous unsolicited stocks from Quarantine, and 40 American varieties obtained from domestic sources.

Preservation and Increase of Stocks

Most of the introductions in the Collection are maintained as true seed families. Over 426 of these were intermated for seed increases in 1990.

Approximately 100 clones were placed into sterile culture. IR-1 now has an in vitro collection of 465 clones and 5 families of rare accessions which have repeatedly resisted seed increase. A total of 588 tests were performed on these and other IR-1 stocks to monitor the presence of viruses and PSTV (potato spindle tuber viroid) in the Collection.

Germination percentages of 300 seedlots were determined.

Several improvements were made to the seed increase and processing routine this year. Several IR-1 screenhouses are in serious need of repair. A replacement screenhouse was designed and built by IR-1 staff. This structure has the best quality, appearance and functionality of any of our screenhouses at savings of about 50% (\$6,500) of professional estimates. We intend to eventually build 3-4 more of these. A new soil storage building was designed by Project staff and is now essentially completed. With this and the used soil shredder purchased this year, a great savings in labor, as well as convenience will be realized, as we will be able to process and store a full year's supply of soil at once. A much needed pot washing room was added to the greenhouse. This was designed with a clear roof and modular fixtures which will allow its use as a small auxiliary greenhouse when not needed for pot and bottle washing. A pot sterilizing oven was built by Project staff. This should reduce the considerable labor required to scrub clay pots and improve control of diseases, pests and algae. Seed increase yields of seven recalcitrant accessions grown as seedlings and cuttings were compared. Cuttings outperformed seedlings in three families, two of which produced no seeds as seedlings. In the other three cases, neither treatment yielded seeds, but cuttings had much improved flowering. Thus, the use of cuttings would seem to be the solution to the problem of seed increase on certain difficult accessions, and a partial solution for others. The summer of 1990 marked the initiation of a test of the practicality of summer screenhouse increases. If successful, summer increases would substantially expand our capacity without

necessitating the building of additional greenhouses. Another significant benefit would be the ability to capitalize on inexpensive summer labor for making the pollinations. The results of an initial trial of 100 accessions were disappointing, but we are hopeful that refinements can be made that will make summer seed increases practical. Bees could perform seed increases for us in outdoor plantings if plots were separated sufficiently to prevent cross-contamination of accessions. The risk of contamination from cultivated potatoes is probably very small considering crossing barriers and the slight potato cultivation in Door County. With this in mind, a "remote" seed increase planting was made 12 miles from IR-1 in a vegetable garden. The accession was chosen at random, and there was no reason to expect it to be particularly amenable to seed increase. Sixteen plants receiving only minimal care produced over 17,000 seeds. Such results indicate that this approach merits further investigation. A pilot experiment was conducted to investigate possible improved pollination techniques. "Bee sticks" were made by gluing a honeybee abdomen onto the tip of a toothpick. These were used to affect pollination in difficult crosses, and results were compared to those on identical crosses using standard pollination techniques. A seeds-per-pollination improvement of 82% was realized.

Classification

Dr. Spooner made confirming determinations on accessions he had collected in Mexico in 1988. Research on species relationships conducted by Dr. Spooner will result in a more stable taxonomy for certain ambiguous taxa. Over 300 new herbarium specimens were prepared. Progress was made toward the goal of a herbarium representation of each accession in the Collection, and improvements were made in the organization of the herbarium and associated reference materials. A total of over 6,000 sheets, representing nearly 115 potato species are now available in the IR-1 herbarium for taxonomic study. PI numbers were assigned to 323 accessions from recent expeditions to Mexico and Bolivia.

Distribution of Stocks

Shipments of seed, tuber, and in vitro stocks were sent to potato workers in 26 states of the United States and to workers in 15 other countries in response to requests. The volume and types of stocks sent to various consignee categories is summarized in the table below:

Volume and Types of Stocks Distributed

Category	Units ¹							Total accessions
	S	TF	TC	IVS	RPS	Other	Total	
Domestic	4,309	788	1	1,469	84	141	6,792	5,285
Foreign	884	227	0	6	0	150	1,267	1,174
IR-1 use ²	1,299	0	879	0	0	0	2,178	2,178
Total	6,492	1,015	880	1,475	84	291	10,237	8,637

¹ Types of Stocks sent/(Number of seeds, tubers or plantlets per standard shipping unit): S= True Seeds/(50), TF= Tuber Families/(10), TC= Tuber Clones/(4), IVS= in vitro Stocks (1), RPS= USDA-WI Cooperative Research Program Stocks, Other= plants, herbarium specimens, pollen, demonstration/teaching materials, leaf samples.

² Includes chromosome counts, germination tests, ID and taxonomic check plantings, in vitro maintenance, seed increases, PSTV tests, research and miscellaneous plantings.

The large number of in vitro stocks and lack of tuber clones shipped reflect the policy to discontinue distribution of tubers from recurrent clonal increases. The tuber family orders tabulated above were requested from a listing of 235 accessions mailed to approximately 350 cooperators worldwide. The number of domestic orders were up substantially from last year, as was number of units shipped to cooperators in the Southern Region.

Domestic Distributions by Region

Region	Units		Orders	
	shipped	% of total	shipped	% of total
North Central	4,698	69	67	57
North Eastern	889	13	19	16
Southern	361	5	11	9
Western	844	13	21	18
Total	6,792	100	118	100

Several refinements were made in the order processing routine. A program was designed to print packet labels from the PC inventory database, thus reducing the hand printing needed on seed envelopes. This expedites large orders. The local order processing computerization routine was more closely tuned to

the format needed for direct loading into GRIN. The first complete inventory of the seed storage was computerized. This includes lots within accessions and latest germination scores. A second culture chamber for in vitro stocks was purchased.

Evaluation of Stocks

A grant proposal for fine screening of about 40 accessions reputed to be resistant to Verticillium, Colorado potato beetle, nematodes or Leaf roll virus was submitted to USDA/ARS. This request proposes fine screening to identify individuals within accessions with reliable resistance which would be useful parents--a top priority of the Potato Crop Advisory Committee. In anticipation of such screening, tuber multiplication of 18 genotypes within each accession was performed.

Data from nearly 40 screening experiments contracted over the last nine years were computerized and summarized using a standardized percentile rating scheme. These ratings would be appropriate to include in the next published inventory.

Intergenebank Collaboration between CIP, the BGRC collection and IR-1 was initiated with a meeting of key personnel in Washington, DC, October 1-2. Participants agreed to 1) exchange technical or "procedures" manuals, 2) distribute an outline of their administrative structures, identifying key personnel, and 3) make a joint inventory database their first collaborative project. Dr. Z. Huaman of CIP volunteered to receive a sample of each bank's database, devise and propose a joint database structure for consideration at a second meeting to be held in about 6 months.

The collection is steadily being evaluated for characteristics of economic importance through the research efforts of state, federal, and foreign laboratories.

Usefulness of Findings

The major objective of the Inter-Regional Potato Introduction Project is to promote and facilitate potato research and breeding by providing a readily available reservoir of germplasm. The success of IR-1 may be measured by the use of introduced germplasm in the pedigrees of new varieties and in research publications.

Three varietal releases were published in 1990: Allegany, Norwis and Steuben. Each of these have at least two foreign introductions in their pedigrees, as is now the case with 191 of 197 varieties released in the United States since 1932. Each of this year's three releases are also known to have non-tuberosum germplasm in their pedigrees.

Research conducted in the United States and other countries provide evidence of the importance of continued utilization of

the IR-1 germplasm collection. IR-1 has documented 73 papers, 25 abstracts, and 10 theses reporting the use of Solanum introductions in 1990.

1990 NORTH CENTRAL REGIONAL POTATO TRIALS

R. H. Johansen and Cooperators^{1/}

The North Central Regional Potato Variety Trials have now been in existence for the past forty years. In 1990, there were 16 states and provinces conducting trials. The trial in Louisiana was lost due to flooding and wet weather conditions. New Jersey entered the NC Trials in 1990.

Cultivars Recently Released:

Year	Name	Sel. No.	Parentage	Released by:
1989	Eide Russet	MN10874	WC325-1 x Norgold Russet	Minnesota

Cooperating States and Provinces:

State or Province	Date Planted	Date Harvested	Total Days to Harvest
Alberta	5/16	10/1	139
Manitoba	5/10	9/19	133
Ontario	5/13	9/25	136
Indiana	4/18	8/14	129
Iowa	4/24	8/9	108
Kentucky	3/29	9/25	181
Louisiana	Trial was lost due to wet weather conditions.		
Michigan	5/8	9/12	128
Minnesota	4/10	8/23	136
Missouri	3/29	8/8	133
Nebraska	4/24	9/14	174
New Jersey	4/10	8/13	151
North Dakota	5/15	9/24	133
Ohio	5/24	9/13	174
South Dakota	5/9	9/9	129
Wisconsin	4/27	9/25	152

Environmental Conditions: Soil type ranged from clay loam to sand; however, most trials were grown on lighter sandy loam soils. Several locations used irrigation.

^{1/} Alberta, Mr. Clive Schaupmeyer; Manitoba, Mr. Brian Rex; Ontario, Mr. Gary Johnston; Indiana, Dr. Hommer Erickson; Iowa, Dr. Bill Summers; Kentucky, Dr. John Snyder; Louisiana, Dr. James Fontenot; Michigan, Dr. Richard Chase and Dr. Dave Douches; Minnesota, Dr. Florian Lauer; Missouri, Dr. V. N. Lambeth; Nebraska, Dr. Alexander D. Pavlista; New Jersey, Dr. Mel Henninger; Ohio, Dr. Mark A. Bennett; South Dakota, Dr. Paul Prashar; Wisconsin, Mr. Donald Kichefski, Dr. Stan Peloquin.

Cultural Practices: Fertilizers, insecticides, herbicides, vine killers, etc. were all based on local conditions. Some of the insecticides used were Thiodan, Guthion, Decis, Sevin, Thimet 20G, Pounce, Asana, Imidan + PBO, Cygon, Pydrin, Rotonone + PBO, Vydate, Furadan, Diazinon. Some of the fungicides used were Bravo, Polyram, Dithane M45, Mancozeb, Penncozeb, Morlate. Some of the herbicides used were Sencar, Dual 8E + Lorax, Pounce, Dacthol.

Weather Conditions: It was wet in Indiana and Missouri during most of the season and near normal rainfall occurred in Ohio, Kentucky, New Jersey, Nebraska, Michigan, Iowa, Ontario and South Dakota. However, it was dry in North Dakota and during some periods in Manitoba. Manitoba had a very wet June. In general, temperatures were not as high in 1990. Michigan had a very good growing season with moderate day temperature and generally cool nights. North Dakota had fair moisture in the early part of the season but very dry during July through September.

Entries: Entries were received from North Dakota, Minnesota, Michigan, Louisiana and Wisconsin. The check varieties Norland, Norgold Russet, Norchip, Russet Burbank and Red Pontiac were supplied by North Dakota.

Total and US No. 1 Yield: Red Pontiac was once again the highest yielding entry in trial. For the past forty years of trials, Red Pontiac has generally been the highest yielding entry which means that no breeder has yet developed a cultivar that will outyield Red Pontiac. Other high yielding entries were Wisc. 870, Wisc. 877 and Wisc. 856. Alberta, Michigan, Minnesota and Wisconsin produced the highest yield. (NC Regional Table 1 and 2).

Percent U.S. No. 1: Mich. 402-8 and Red Pontiac produced the highest percent U.S. No. 1. As usual, Russet Burbank had the lowest percent U.S. No. 1 and this was due mainly to growth cracks, roughness and second growth. Minnesota and Wisconsin had the highest percent U.S. No. 1 (NC Regional Table 3).

Maturity: Norland was once again the earliest maturing entry in trial, followed by ND1196-2R and ND2008-2. Russet Burbank and Wisc. 856 were the latest maturing entries (NC Regional Table 4).

Percent Total Solids: Wisc. 870 and Wisc. 877, with an average of 22.3 and 22.2 percent, respectively, had the highest percent total solids of all entries in trial. Red Pontiac and Norland had the lowest percent total solids (NC Regional Table 5).

Scab Reaction: Minnesota, Wisconsin and Indiana seemed to have the most scab. Wisc. 877 seemed to be the most susceptible to severe scab. The russet entries seemed to have the least scab. Severe scab was reported in Nebraska (NC Regional Table 6).

Summary of Grade Defects: Again grade defects varied from location to location. Manitoba, Nebraska, Indiana, Ontario and North Dakota reported that several entries had scab. Russet Burbank again had the most off shape and second growth. Grade defects are found in North Central Regional Table 7. Kentucky, Ohio, and Nebraska seemed to have severe growth cracking. Ohio and Minnesota had severe hollow heart. Indiana seemed to have several entries that had both severe, internal necrosis and vascular discoloration. Certain entries are starred to indicate its weakness. The breeder should consider these weaknesses when deciding to release that particular selection as a named cultivar.

Chip Color: North Central Regional Table 8 shows the chip color either as an Agtron reading or by the chip color chart. All samples were chipped out of the field or before storage, with the exception of Alberta, where the samples were stored at 4°C prior to chipping. In general, Alberta reported quite dark chips. The best chippers seemed to be the three Wisc. entries -- Wisc. 856, Wisc. 870 and Wisc. 877. Other good chippers were Mich. 401-1, ND2008-2 and Minn. 13740.

Overall Merit Ratings: Merit ratings for all locations are found in North Central Regional Table 9. The chart below shows the top five selections. For comparison, merit ratings for the past 2 years are also included.

Selection	Total Points		
	1988	1989	1990
Wisc. 870			39
LA12-59			32
Wisc. 856			27
ND1538-1Russ		17	26
ND1196-2R			17

North Central Regional Trial Table 1. Total Yield (Cwt./Acre) - 1990.

Cultivar or Selection	Man.	Ont.	Alb.	IN	IA	KY	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
Early to Medium Early																
Norland	193	296	433	55	206	269	319	362	89	218	200	137	235	306	434	250
Norchip	208	409	466	116	202	352	405	456	93	320	168	145	300	299	428	291
Norgold Russet	165	370	505	87	202	352	329	453	85	187	236	136	274	238	401	268
ND1196-2R	200	383	402	79	140	353	375	454	102	293	186	172	310	348	543	289
ND2008-2	203	314	468	112	190	322	373	445	123	226	244	124	345	293	419	280
Medium Late to Late																
MN12966	163	300	365	79	188	326	378	414	134	196	221	125	295	280	397	257
MN13540	139	384	501	60	227	351	483	530	74	255	233	156	347	205	441	292
MN13740	165	369	472	112	216	341	434	476	89	303	220	150	352	271	486	297
Mich. 401-1	164	358	404	72	163	306	407	376	82	325	180	129	374	294	552	279
Mich. 402-8	129	275	201	47	151	239	217	217	109	160	121	74	69	169	352	169
ND1538-1Russ	179	374	479	136	184	454	466	557	49	293	299	188	352	304	550	324
LA 12-59	195	335	429	90	198	371	520	--	122	272	260	190	408	404	555	311
Wisc. 856	175	429	537	147	188	312	500	475	136	308	239	125	284	440	592	326
Wisc. 870	144	374	466	142	216	324	427	531	156	361	308	125	356	372	568	325
Wisc. 877	110	286	379	97	172	373	403	418	129	279	174	124	192	332	479	263
Red Pontiac	238	513	686	131	225	463	618	637	136	398	310	195	375	393	664	399
Russet Burbank	193	450	262	143	198	343	482	583	98	177	249	123	366	298	519	299
Average	174	366	439	100	192	344	420	462	106	269	226	142	308	309	493	

North Central Regional Trial Table 2. U.S. No. 1 Yield (Cwt/Acre) - 1990

Cultivar or Selection	Man.	Ont.	Alb.	IN	IA	KY	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
Early to Medium Early																
Norland	161	216	327	ND	178	179	278	337	20	204	170	126	207	261	405	219
Norchip	171	312	236	ND	171	247	340	429	36	298	119	121	249	252	392	241
Norgold Russet	76	254	346	ND	150	224	180	408	18	150	114	103	205	153	336	194
ND1196-2R	156	274	234	ND	122	212	323	413	42	262	139	155	263	292	501	242
ND2008-2	164	201	313	ND	138	227	340	414	69	204	218	98	286	239	370	234
Medium Late to Late																
MN12966	134	197	266	ND	158	211	335	389	74	179	194	99	271	241	356	222
MN13540	77	265	254	ND	169	193	406	493	7	218	166	123	257	153	381	226
MN13740	113	276	310	ND	179	242	388	438	29	279	161	133	313	201	441	250
Mich. 401-1	82	235	210	ND	129	216	351	327	33	296	146	94	337	249	495	229
Mich. 402-8	116	232	147	ND	140	169	205	204	89	146	110	64	50	158	345	155
ND1538-1Russ	132	271	325	ND	138	332	388	540	7	250	190	171	246	250	517	268
LA 12-59	157	253	329	ND	178	264	485	--	40	245	230	159	359	348	530	275
Wisc. 856	140	318	420	ND	172	223	482	456	69	284	175	114	219	409	539	287
Wisc. 870	113	290	328	ND	192	226	402	504	83	342	285	104	285	338	552	289
Wisc. 877	45	203	269	ND	141	255	371	376	62	257	147	106	171	280	445	223
Red Pontiac	204	412	564	ND	207	344	579	611	62	386	257	183	315	353	637	365
Russet Burbank	131	250	123	ND	65	255	366	542	38	146	101	50	271	225	450	215
Average	128	262	294	ND	155	236	366	430	46	244	172	118	253	259	453	

ND - No data reported.

North Central Regional Trial Table 3. Average Percent U.S. No. 1 (over 2" diameter) - 1990

Cultivar or Selection	Man.	Ont.	Alb.	IN	IA	KY	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
Early to Medium Early																
Norland	83	73	76	ND	86	66	87	93	22	17	84	92	88	85	93	75
Norchip	82	76	51	ND	85	70	81	94	39	20	68	83	83	84	92	72
Norgold Russet	46	69	69	ND	74	63	54	90	21	19	48	76	75	64	84	61
ND1196-2R	78	72	58	ND	87	60	86	91	41	18	75	90	85	84	92	73
ND2008-2	81	64	67	ND	80	70	91	93	56	18	89	80	83	82	88	74
Medium Late to Late																
MN12966	82	66	73	ND	84	65	89	94	55	20	87	79	92	86	90	76
MN13540	56	69	50	ND	74	55	83	93	9	19	72	79	74	75	86	64
MN13740	68	75	66	ND	83	71	89	92	33	20	65	88	89	74	91	72
Mich. 401-1	50	66	52	ND	79	69	86	87	40	21	81	73	90	85	90	69
Mich. 402-8	89	84	73	ND	93	70	94	94	82	21	91	86	73	94	98	82
ND1538-1Russ	74	72	68	ND	75	73	82	97	14	21	64	91	70	82	94	70
LA 12-59	80	75	77	ND	90	71	93	--	33	21	87	84	88	86	95	75
Wisc. 856	80	74	77	ND	92	71	96	96	51	19	77	91	77	93	91	78
Wisc. 870	78	77	69	ND	89	70	94	95	53	22	92	83	80	91	97	78
Wisc. 877	40	71	71	ND	82	68	92	90	48	21	83	85	89	84	93	73
Red Pontiac	86	80	82	ND	92	74	94	96	46	17	82	94	84	90	96	80
Russet Burbank	68	56	43	ND	33	74	76	93	39	19	48	41	74	76	87	59
Average	72	72	66	ND	81	68	87	93	40	20	76	82	82	83	92	

ND - No data reported.

North Central Regional Trial Table 4. Maturity Classification^{1/} - 1990

Cultivar or Selection	Man.	Ont.	Alb.	IN	IA	KY	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
Early to Medium Early																
Norland	1.0	2.5	ND	ND	1.0	ND	ND	1.0	ND	1.0	ND	2.8	ND	1.3	1.7	1.5
Norchip	3.0	3.5	ND	ND	3.0	ND	ND	3.0	ND	3.5	ND	3.8	ND	2.5	3.0	3.2
Norgold Russet	2.0	3.4	ND	ND	3.0	ND	ND	2.0	ND	2.0	ND	3.0	ND	3.0	3.2	2.7
ND1196-2R	1.0	2.6	ND	ND	2.0	ND	ND	1.0	ND	1.0	ND	2.5	ND	2.3	1.7	1.7
ND2008-2	1.0	2.6	ND	ND	3.0	ND	ND	1.0	ND	1.0	ND	2.0	ND	1.8	2.2	1.9
Medium Late to Late																
MN12966	1.0	2.9	ND	ND	3.0	ND	ND	2.0	ND	1.0	ND	1.5	ND	2.8	2.0	2.0
MN13540	1.0	3.3	ND	ND	3.0	ND	ND	3.0	ND	3.5	ND	3.8	ND	2.3	2.2	2.8
MN13740	1.5	3.1	ND	ND	3.0	ND	ND	3.0	ND	3.0	ND	2.5	ND	1.5	3.0	2.6
Mich. 401-1	1.0	3.5	ND	ND	3.0	ND	ND	3.0	ND	3.5	ND	1.8	ND	1.8	2.7	2.5
Mich. 402-8	2.0	3.4	ND	ND	3.0	ND	ND	2.0	ND	2.0	ND	2.5	ND	2.0	3.7	2.6
ND1538-1Russ	2.0	3.3	ND	ND	3.0	ND	ND	4.0	ND	3.0	ND	3.0	ND	4.3	2.7	3.2
LA 12-59	1.5	3.4	ND	ND	3.0	ND	ND	--	ND	3.0	ND	4.0	ND	3.5	3.2	3.1
Wisc. 856	2.5	3.6	ND	ND	4.0	ND	ND	4.0	ND	4.5	ND	4.8	ND	4.8	3.7	4.0
Wisc. 870	2.0	3.5	ND	ND	4.0	ND	ND	4.0	ND	2.0	ND	2.8	ND	4.8	3.5	3.3
Wisc. 877	1.0	3.5	ND	ND	4.0	ND	ND	3.0	ND	3.0	ND	3.8	ND	3.0	3.1	3.1
Red Pontiac	4.0	4.0	ND	ND	3.0	ND	ND	3.0	ND	3.5	ND	3.8	ND	5.0	3.5	3.7
Russet Burbank	3.0	4.6	ND	ND	5.0	ND	ND	4.0	ND	4.5	ND	4.8	ND	5.0	4.0	4.4
Average	1.8	3.3	ND	ND	3.1	ND	ND	2.7	ND	2.7	ND	3.1	ND	3.0	2.9	

- 1/ 1. Very Early - Norland Maturity
2. Early - Irish Cobbler Maturity
3. Medium - Red Pontiac Maturity
4. Late - Katahdin Maturity ND - No data reported
5. Very Late - Russet Burbank Maturity

North Central Regional Trial Table 5. Percent Total Solids - 1990

Cultivar or Selection	Man.	Ont.	Alb.	IN	IA	KY	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
Early to Medium Early																
Norland	20.0	17.3	18.5	13.7	14.0	15.0	17.0	16.0	14.5	17.1	15.0	19.4	16.8	15.8	15.6	16.4
Norchip	23.5	21.7	22.5	16.5	17.2	17.8	20.6	20.4	16.0	19.9	17.7	20.7	19.6	18.5	20.1	19.5
Norgold Russet	22.5	18.5	21.5	14.3	14.3	16.7	19.4	19.0	14.5	19.4	15.8	19.0	17.1	18.3	17.1	17.8
ND1196-2R	20.0	17.9	19.5	13.9	14.4	15.0	16.6	17.5	14.5	18.4	15.0	18.2	16.6	17.2	16.2	16.7
ND2008-2	22.5	19.8	20.3	15.8	15.2	15.9	18.5	15.9	15.5	18.4	15.6	19.9	18.5	17.1	17.1	17.7
Medium Late to Late																
MN12966	23.8	19.8	22.3	14.0	14.4	15.5	19.0	18.6	15.4	20.1	16.5	20.9	18.3	18.5	18.0	18.3
MN13540	22.0	19.6	22.3	14.0	14.3	16.3	19.6	18.6	14.5	18.8	15.4	20.7	18.5	16.0	16.9	17.8
MN13740	23.8	22.3	23.3	16.0	15.7	16.7	20.4	19.5	15.0	19.7	16.9	21.8	18.7	18.5	18.4	19.1
Mich. 401-1	25.5	21.9	24.8	16.9	17.1	19.5	21.4	21.4	16.7	20.9	18.4	23.5	19.8	19.9	20.1	20.5
Mich. 402-8	22.8	19.4	21.4	15.6	15.5	17.1	19.2	19.0	16.6	20.5	17.1	21.2	--	14.4	18.4	18.4
ND1538-1Russ	22.3	19.0	20.5	14.2	14.3	16.7	19.6	19.6	--	20.5	15.6	20.5	17.9	16.7	16.9	18.2
LA 12-59	23.5	21.3	22.3	14.0	15.7	18.2	20.2	--	14.5	21.2	16.7	20.7	18.5	18.8	20.1	19.0
Wisc. 856	24.0	20.6	21.8	15.6	17.2	18.8	21.5	21.5	14.9	18.8	17.1	20.7	20.2	18.8	20.1	19.4
Wisc. 870	27.0	24.2	25.0	18.8	20.6	21.1	22.4	24.2	18.2	22.2	20.1	23.1	23.2	21.1	23.3	22.3
Wisc. 877	28.5	23.4	25.2	19.7	20.1	20.1	24.1	24.8	17.5	20.7	20.1	22.4	23.2	21.6	22.0	22.2
Red Pontiac	20.3	16.6	19.3	13.7	14.1	15.0	18.3	17.7	14.5	17.3	13.1	17.7	16.2	16.0	16.7	16.4
Russet Burbank	23.3	20.0	21.6	16.3	16.4	18.4	21.5	21.6	16.0	19.0	17.3	19.2	20.6	19.2	18.6	19.3
Average	23.3	20.2	20.5	15.5	15.9	17.3	20.0	19.7	15.6	19.6	16.7	20.6	19.0	18.0	18.6	

ND - No data reported.

North Central Regional Trial Table 6. Scab Reaction Report. Most Representative Scab
(Area Type)^{1/} - 1990

Cultivar or Selection	Man.	Ont.	Alb.	IN	IA	KY	MI	MN	MO	NE	NJ	ND	OH	SD	WI
Early to Medium Early															
Norland	1-2	T-1	ND	2-2	T-1	T-1	0-0	5-2	T-0	T-1	1	T-1	0-0	ND	1-3
Norchip	1-2	1-1	ND	1-2	0-0	T-1	T-2	3-2	T-0	T-1	2	T-1	0-0	ND	1-4
Norgold Russet	T-1	1-2	ND	0-0	0-0	T-1	0-0	1-1	T-0	T-1	3	0-0	0-0	ND	0-0
ND1196-2R	1-2	1-2	ND	1-2	T-1	T-1	T-3	5-5	T-0	T-1	2	T-1	0-0	ND	1-4
ND2008-2	T-1	1-1	ND	4-2	0-0	T-1	T-4	5-4	T-0	T-1	2	T-2	1-3	ND	2-4
Medium Late to Late															
MN12966	1-1	T-1	ND	1-3	T-1	T-1	0-0	1-2	T-0	T-1	2	T-1	0-0	ND	0-0
MN13540	2-1	2-1	ND	2-3	0-0	T-1	0-0	5-3	T-0	T-1	3	T-1	0-0	ND	2-2
MN13740	2-1	2-1	ND	4-1	0-0	T-1	T-3	5-2	T-0	T-1	4	2-2	0-0	ND	0-0
Mich. 401-1	2-1	T-5	ND	1-2	0-0	T-1	T-4	5-5	T-0	T-1	2	1-1	T-1	ND	2-5
Mich. 402-8	1-1	T-1	ND	1-1	0-0	T-1	T-3	5-3	T-0	T-1	3	T-1	T-1	ND	1-4
ND1538-1Russ	1-1	1-1	ND	1-2	0-0	T-1	0-0	3-1	T-0	T-1	4	0-0	0-0	ND	0-0
LA 12-59	1-2	T-1	ND	2-3	0-0	T-1	0-0	--	T-0	T-1	3	T-1	0-0	ND	0-0
Wisc. 856	T-1	2-1	ND	1-1	0-0	T-1	T-1	3-2	T-0	T-1	2	T-1	0-0	ND	1-4
Wisc. 870	T-1	1-4	ND	1-2	0-0	T-1	T-4	5-4	T-0	T-1	3	1-1	0-0	ND	1-4
Wisc. 877	1-2	T-3	ND	1-1	0-0	T-1	T-4	5-5	T-0	T-5	3	3-2	0-0	ND	2-5
Red Pontiac	1-2	1-4	ND	2-1	T-2	T-1	2-4	5-5	T-0	T-1	3	1-1	0-0	ND	3-5
Russet Burbank	0-0	T-1	ND	1-1	0-0	T-1	0-0	2-2	T-0	T-1	5	0-0	0-0	ND	0-0

^{1/} AREA ND - No data reported

TYPE

- 1 = Small, superficial
2 = Larger, superficial
3 = Larger, rough pustules
4 = Larger pustules, shallow eyes
5 = Very large pustules, deep holes

T = less than 1%

- 1 = 1-20%
2 = 21-40%
3 = 41-60%
4 = 61-80%
5 = 81-100%

North Central Regional Trial Table 7. Summary of Grade Defects - 1990

Cultivar or Selection	Scab	External				Internal				
		Growth Cracks	Off Shape and Second Growth	Tuber Rot	Sun Green	Total Free of Ext. Defects	Hollow Heart	Internal Necrosis	Vascular Discolor ation	Total Free of Int. Def.
Nor-Land	13.0	1.9	3.1	.5	1.5	81.0	.4	.6	3.3	95.6
Norchip	11.0	2.6	8.5*	.1	5.0*	76.0	1.1	2.3	5.0	92.0
Norgold Russet	4.0	.5	9.3*	.3	2.0	86.0	1.9	.2	2.6	96.1
ND1196-2R	16.0	1.7	2.9	.5	2.7	77.0	.4	.7	1.3	97.6
ND2008-2	19.0*	1.9	4.4	.5	4.3*	72.0	3.8*	2.4	2.4	91.5
Medium Late to Late										
MN12966	12.0	1.8	4.4	0	.6	84.0	.2	0	5.5*	94.5
MN13540	15.0	.4	3.0	.6	1.4	80.0	1.1	1.9	.9	96.2
MN13740	18.0*	.6	6.1	.1	.6	76.0	.3	.1	3.4	96.3
Mich. 401-1	19.0*	.4	.6	.2	1.0	80.0	5.6*	.4	3.5	90.3
Mich. 402-8	10.0	1.4	1.6	.5	4.1*	83.0	1.7	1.0	2.2	95.5
ND1538-1Russ	8.0	2.1	8.2*	.2	1.3	83.0	1.4	.3	1.9	96.5
LA 12-59	13.0	2.9*	2.8	.6	.8	81.0	.3	0	2.6	96.9
Wisc. 856	10.0	1.6	6.8	0	.9	81.0	1.8	1.3	4.3	92.4
Wisc. 870	11.0	1.1	3.7	.2	3.5	82.0	2.1	2.6	2.5	93.0
Wisc. 877	18.0*	.4	3.6	.1	2.1	77.0	1.6	9.6*	4.4	84.3
Red Pontiac	22.0*	1.9	7.3	.4	1.1	69.0	2.1	.2	3.6	94.1
Russet Burbank	4.0	3.1*	30.5*	.5	.9	64.0	3.3	1.4	2.9	92.4

1/ Percent normal tubers showing no defects (some individuals had more than one type of defect.)

*Possible weakness of cultivar or clone.

North Central Regional Trial Table 8. Chip Color - 1990.

Cultivar or Selection	Man. ²	Ont. ²	Alb. ²	IN ¹	IA ³	KY ¹	MI ²	MN	MO ²	NE ²	NJ ¹	ND ²	OH ¹	SD	WI ¹
Early to Medium Early															
Norland	33	43	10	3	ND	3	53	ND	30	33	--	46	--	ND	7.7
Norchip	42	63	16	3	ND	2	68	ND	65+	59	556	48	3	ND	5.5
Norgold Russet	29	37	11	3	ND	4	39	ND	30	22	--	24	4	ND	8.5
ND1196-2R	28	43	10	5	ND	4	59	ND	55	31	--	49	--	ND	10.0
ND2008-2	55	67	23	2	ND	1	59	ND	64	48	556	53	3	ND	3.5
Medium Late to Late															
MN12966	33	61	13	4	ND	4	52	ND	65+	50	--	48	--	ND	8.0
MN13540	34	64	15	2	ND	2	58	ND	54	52	899	47	2	ND	8.3
MN13740	44	70	16	3	ND	2	67	ND	65+	56	457	49	3	ND	6.3
Mich. 401-1	53	70	17	2	ND	1	72	ND	65+	51	446	51	2	ND	4.5
Mich. 402-8	33	62	11	4	ND	2	63	ND	65+	48	658	49	--	ND	6.5
ND1538-1Rus	32	62	12	3	ND	4	42	ND	38	34	--	41	3	ND	6.5
LA 12-59	37	52	15	--	ND	2	64	ND	65+	49	--	41	--	ND	5.6
Wisc. 856	46	62	12	2	ND	2	63	ND	65+	57	888	41	3	ND	5.5
Wisc. 870	51	66	17	1	ND	2	64	ND	65+	49	557	39	2	ND	4.5
Wisc. 877	57	56	29	2	ND	1	58	ND	64	53	687	43	3	ND	3.5
Red Pontiac	25	32	10	4	ND	4	35	ND	45	26	--	27	--	ND	9.0
Russet Burbank	32	53	18	5	ND	3	60	ND	50	42	--	40	4	ND	7.5
Average	39	57	15	3	ND	3	57	ND	56	45	634	43	3	ND	6.5

1/ PCII Color Chart (1 = lightest; 10 = darkest)

2/ Agron (Highest number lightest)

ND - No data reported

North Central Regional Trial Table 9. Merit Ratings - 1990^{1/}.

Cultivar or Selection	Man.	Ont.	Alb.	IN	IA	KY	MI	MN	MO	NE	NJ	ND	OH	SD	WI	TOTAL
Early to Medium Early																
Norland	1											1				2
Norchip	3					3										6
Norgold Russet						1		1			1	3	3	2	2	2
ND1196-2R			5						2							17
ND2008-2	4															6
Medium Late to Late																
MN12966		1			2			3				2	4			9
MN13540		4		2	4	2					4					6
MN13740				3						2	3					16
Mich. 401-1					5				5							8
Mich. 402-8						5		5			2	4	2		3	13
ND1538-1Rus		2	3		3	5	2			3		5	5	3	1	26
LA 12-59	2		2			4	5	4	1							32
Wisc. 856			4	5			4								4	27
Wisc. 870		5	1	4	1		3	2	4	5	5			4	5	39
Wisc. 877		3					1							1		5
Red Pontiac	5			1						4			1			11
Russet Burbank																0

1/ Merit Ratings

Rating	Points
1	5
2	4
3	3
4	2
5	1

WESTERN REGIONAL POTATO VARIETY TRIAL - 1990

J. J. Pavek, D. L. Corsini, and Cooperators^{1/}

Uniform Potato Yield Trial

The 1990 trial was grown at twelve locations for yield and two for disease data. Seventeen entries, 11 experimental, two standard checks, three early checks and one red check, were grown at most of the locations. Three locations grew entries for both early and late harvest. The trial locations, dates of planting, vine killing, and harvest, and days from planting to harvest were as follows:

State	Location	Planting Date	Vine Kill Date	Harvest Date	Days to Harvest
California	Kern Co.	2/13	-	6/18	125
"	Tulelake	5/14	-	9/27	136
Colorado	San Luis Vly	5/18	9/3	9/17	123
Idaho	Aberdeen	4/26	9/10	9/19	146
"	Kimberly-Early	4/25	8/1	8/2	99
"	Kimberly-Late	4/25	-	10/11	169
New Mexico	Clovis	4/4	8/20	8/23	141
"	Farmington	4/27	-	9/28	154
Oregon	Hermiston-Early	4/3	7/18	8/6	121
"	Hermiston-Late	4/26	9/10	10/19	176
"	Klamath Fls	5/22	9/10	9/28	129
"	Malheur	4/18	10/1	10/5	170
Texas	Springlake	3/28	8/1	8/21	146
Washington	Othello - Early	4/5	-	8/6	123
"	Othello - Late	4/24	9/7	9/18	166
"	Prosser (Disease Data Only)				

Cultural practices and the use of fertilizer, herbicides, pesticides, and vine killing varied according to local conditions. Trial plots at all locations were irrigated on a regular schedule throughout the entire growing season according to plant needs. Most locations had well above normal early growing season temperatures and then mostly normal later. Kern County, California was most normal throughout its season.

Data on vines, tubers, yield, internal quality, disease reactions, merit scores, and disposition are presented in Western Tables 1 through 7. AC7869-17 (russet) and BC0038-1 (white) showed promise for both fresh market and processing, while four russets, AC81198-11, C080011-5, C082142-4, ND1538-1RUS, showed promise for fresh use only; ND1538-1RUS appeared susceptible to blackspot and ND671-4RUS was small at some locations. These seven are being tested further. The other selections have been dropped.

^{1/}California, R. Voss, K. Brittan; Colorado, D. Holm; Idaho, S. Love, G. Kleinkopf; New Mexico, N. Christenson, E.J. Gregory; Oregon, A. Mosley, D. Hane, K. Rykbost, C. Stanger, S. James; Texas, D. Smallwood, J. C. Miller; Washington, R. Thornton, W. Iritani, M. Martin, C. Brown, L. Mikitzel.

Western Table 1. 1990 Seed source, stand, tuber and vine characteristics, and foliar and tuber diseases.^{1/}

Entry	Seed Source	Stand (9 loc) %	TUBERS		Vine Size	Mat	Vert. Wilt	E. Blight		Scab	Leaf- roll NN
			Shape	Skin				Fol	Tuber		
AC77101-1	CO	92	O	Rus	MS	ME	S	S	R	R	R
AC7869-17	CO	93	O	Rus	ML	ME	S	MR	R	R	S/MR
AC81198-11	CO	92	O	Rus	ML	ML	S	S	R	R	S/R
BC0038-1	CO	93	O	Wht	M	M	S	S	R	S/R	S/R
CO79018-11	CO	80	O	Rus	M	M	S	S	R	S	MS
CO80011-5	OR	90	O	Rus	M	ME	S	S	R	R	R
CO82142-4	CO	91	O	Rus	M	ML	MS	S/MR	--	S	--
ND671-4RUS	WA	86	O	Rus	MS	ME	VS	S	--	R	--
ND1538-1RUS	WA	96	L	Rus	MS	ML	S	S	--	R	--
TND329-1RUS	CA	84	L	Rus	M	ME	MS	S	R	R	MR
Lemhi Russet	CK	95	L	Rus	ML	ML	MS	S	R	R	R
Russet Burbank	CK	96	L	Rus	ML	ML	MS	S	R	R	VS
Norgold Russet	CK	93	O	Rus	MS	E	S	S	MR	R	R
Russet Norkotah	CK	95	L	Rus	ML	E	VS	S	--	R	--
Shepody	ID	96	L	Wht	ML	M	S	S	--	MS	--
NDTX8-731-8R	CA	93	R	Red	S	E	MS	S	MR	MS	R
Red LaSoda	CK	94	R	Red	ML	ML	MS	S	S	MS	MR

^{1/}Shape: O = oblong, L = long, R = round; Vine size: S = small, M = medium, MS = medium small, ML = medium large, Lrg = large; Mat = maturity: E = early, M = medium, L = late, ML = medium late, ME = medium early, ML = medium late; Disease reaction: R = resistant, S = susceptible, MR = moderately resistant, MS = moderately susceptible, VS = very susceptible; if two different reactions are shown, the first is for Prosser, the second for Aberdeen; Vert. = Verticillium, NN = net necrosis.

Western Table 2. 1990 Total tuber yield, cwt/acre. Full season and early harvest, earlyharvest in parentheses.

Entry	Calif		Colo	Idaho		NMex		Oregon		Texas	Wash		Overall Mean
	Krn	Tul	SLV	Ab	Kim	Clv	Frm	Hrm	Klm	Spr	Oth		
AC77101-1	(339)	438	455	325	466 (266)	240	373	485 (529)	511	555	272	373 (418)	409(388)
AC7869-17	(291)	300	432	362	398 (240)	246	409	463 (418)	446	449	204	390 (382)	373(333)
AC81198-11	---	---	489	427	529 (275)	234	438	562 (470)	546	444	270	346 (289)	429(345)
BC0038-1	---	370	502	377	364 (252)	269	283	---	---	---	161	430 (323)	345(---)
C079018-11	(288)	357	391	289	344 (153)	258	474	662 (464)	467	581	239	382 (355)	404(315)
C080011-5	(270)	432	448	323	340 (221)	380	358	686 (348)	396	500	326	343 (444)	412(321)
C082142-4	(225)	371	422	293	377 (117)	181	365	456 (382)	512	441	272	347 (323)	367(262)
ND671-4RUS	---	351	261	319	330 (241)	216	238	437 (331)	422	471	167	481 (364)	336(312)
ND1538-1RUS	(141)	349	427	350	346 (217)	262	339	520 (407)	505	563	205	444 (397)	392(291)
TND329-1RUS	(173)	242	---	---	---	237	237	551 (296)	323	529	219	---	334(214)
Lemhi Russet	---	---	533	403	508 (300)	---	---	549 (---)	530	499	---	307 (---)	475(---)
Russet Burbank	(107)	413	391	370	505 (299)	---	---	587 (---)	564	678	---	404 (---)	489(---)
Norgold Russet	---	---	415	---	---	273	---	---	(394)	---	128	---	328(---)
Russet Norkotah	---	---	351	---	---	375	---	456 (353)	---	566	181	---	386(268)
Shepody	---	---	467	387	---	---	---	---	---	---	---	---	427(---)
NDTX8-731-8R	(364)	---	349	---	---	294	---	389 (266)	511	---	241	---	357(286)
Red LaSoda	(387)	444	470	---	---	353	---	---	---	---	308	---	394(391)
Location Means	(259)	370	425	352	410 (233)	273	351	523 (388)	478	521	228	386 (338)	392(305)

Western Table 3. 1990 U.S. No. 1's, percent of total yield for locations; overall mean, percent and cwt/acre; early harvest in parentheses.

Entry	Calif		Colo		Idaho		NMex		Oregon			Texas		Wash		Mean	
	Krn	Tul	SLV	Ab	Kim	Clv	1/ Frm	Hrm	Klm	Mal	Spr	Oth	%	cwt/A			
AC77101-1	(83)	74	78	68	80(44)	26	88	81(81)	81	76	60	54(83)	70	296(272)			
AC7869-17	(80)	52	87	80	77(66)	27	90	85(90)	79	87	50	63(78)	71	277(278)			
AC81198-11	(--)	--	83	75	80(44)	19	90	67(79)	41	82	19	49(80)	61	277(213)			
BC0038-1	(--)	58	77	73	71(42)	38	82	--(--)	--	--	71	72(81)	64	231(185)			
C079018-11	(75)	45	85	84	67(30)	41	84	79(82)	65	85	69	55(73)	69	287(225)			
C080011-5	(81)	67	81	49	45(18)	31	84	82(84)	72	78	58	43(73)	63	289(219)			
C082142-4	(80)	60	91	87	63(9)	29	88	74(84)	78	80	66	58(86)	70	268(197)			
ND671-4RUS	(--)	58	55	61	58(39)	47	74	77(69)	78	69	41	80(80)	61	218(205)			
ND1538-1RUS	(72)	61	85	68	58(45)	60	87	56(84)	80	63	46	38(61)	61	244(196)			
TND329-1RUS	(83)	63	--	--	--(59)	34	79	84(80)	72	88	47	--(53)	67	238(150)			
Lemhi Russet	(--)	--	76	72	72(41)	--	--	63(--)	77	80	--	49(--)	70	338(---)			
Russet Burbank	(50)	68	53	44	47(33)	--	--	74(--)	74	48	--	39(--)	56	278(---)			
Norgold Russet	(--)	--	78	--	--(--)	22	--	--(83)	--	71	30	--(55)	50	194(237)			
Russet Norkotah	(--)	--	80	--	--(48)	62	--	88(85)	--	79	48	--(66)	71	290(185)			
Shepody	(--)	--	81	73	--(53)	--	--	--(--)	--	--	--	--(60)	77	331(149)			
NDTX8-731-8R	(88)	--	78	--	--(74)	35	--	88(77)	86	--	72	--(77)	72	267(229)			
Red LaSoda	(88)	64	83	--	--(59)	39	--	--(--)	--	--	60	--(85)	62	250(309)			
Location Means	(81)	61	79	69	66(45)	39	85	76(73)	73	75	52	55(74)	65	255(212)			

1/ Clovis, NM: U.S. NO. 1's, >6 oz.

Western Table 4. 1990 U.S. No. 1's over 12 oz, percent of total yield for locations; overall mean, percent and cwt/acre; early harvest in parentheses.

Entry	Calif		Colo		Idaho		NMex		Oregon			Texas		Wash		Mean	
	Krn	Tu1	SLV	Ab	Kim	Clv	Fr ^m	1/ Fr ^m	Hrm	Klm	Mal	Spr	Oth	%	cwt/A		
AC77101-1	(6)	17	16	2	5 (0)	2	26		28 (24)	26	8	4	13 (27)	13	60 (58)		
AC7869-17	(7)	30	23	11	21 (0)	1	22		39 (43)	34	19	1	30 (42)	21	86 (97)		
AC81198-11	--	--	33	7	12 (0)	1	26		28 (35)	15	20	0	13 (35)	16	75 (76)		
BC0038-1	--	20	29	2	6 (0)	4	2		-- --	--	--	1	15 (14)	11	42 (23)		
CO79018-11	(1)	23	38	10	4 (1)	9	13		27 (26)	12	10	9	22 (34)	16	68 (62)		
CO80011-5	(4)	16	17	0	1 (0)	2	7		29 (16)	32	9	5	8 (23)	11	54 (42)		
CO82142-4	(5)	20	41	7	2 (0)	3	18		25 (9)	28	9	6	7 (27)	15	62 (34)		
ND671-4RUS	--	20	3	2	2 (1)	2	3		10 (5)	20	7	3	20 (10)	8	33 (19)		
ND1538-1RUS	(7)	22	21	4	3 (0)	1	2		11 (21)	29	5	5	8 (13)	10	43 (36)		
TND329-1RUS	(2)	7	--	--	-- (0)	1	10		41 (9)	19	27	1	-- (0)	15	68 (8)		
Lemhi Russet	--	--	14	4	3 (0)	--	--		26 --	29	11	--	8 --	14	68 --		
Russet Burbank	(0)	10	4	2	2 (0)	--	--		24 --	18	3	--	1 --	8	43 --		
Norgold Russet	--	--	15	--	-- --	3	--		-- (10)	--	5	3	-- (3)	7	25 (24)		
Russet Norkotah	--	--	17	--	-- (0)	22	--		12 (13)	--	5	1	-- (5)	11	46 (19)		
Shepody	--	--	27	7	-- (0)	--	--		-- --	--	--	--	-- (15)	17	76 (26)		
NDTX8-731-8R	(7)	--	18	--	-- (1)	1	--		25 (24)	31	--	2	-- (32)	15	66 (47)		
Red LaSoda	(10)	23	25	--	-- (1)	7	--		-- --	--	--	4	-- (38)	15	65 (74)		
Location Means	(6)	19	22	5	6 (0)	5	10		25 (20)	24	10	4	13 (21)	14	56 (40)		

1/ U.S. No. 1's over 3".

Western Table 5. 1990 Specific gravity of tubers; early harvest in parentheses.

Entry	Calif		Colo		Idaho		NMex		Oregon			Texas		Wash		Overall Mean
	Krn	Tul	SLV	Ab	Kim	Clv	Frm	Hrm	Klm	Mal	Spr	Oth	Wash	Oth	Wash	
AC77101-1	-- 1.073	1.080	1.080	1.083	1.080(73)	--	1.076	1.065 (70)	1.079	1.096	1.074	1.059(72)	1.077	(72)		
AC7869-17	-- 78	85	85	88	81(69)	--	79	65 (71)	82	92	77	63(71)	79	(70)		
AC81198-11	--	--	85	87	83(69)	--	79	67 (70)	83	82	78	63(70)	79	(70)		
BC0038-1	-- 74	89	89	86	79(77)	--	81	-- (--)	--	--	79	72(74)	80	(76)		
C079018-11	-- 75	81	81	80	73(66)	--	81	64 (69)	78	71	78	60(66)	74	(67)		
C080011-5	-- 66	72	72	73	62(64)	--	72	60 (59)	74	81	67	50(59)	68	(61)		
C082142-4	-- 77	93	93	84	82(72)	--	84	67 (73)	84	86	75	64(71)	80	(72)		
ND671-4RUS	-- 67	76	76	70	71(77)	--	77	61 (66)	67	76	64	63(69)	69	(71)		
ND1538-1RUS	-- 71	79	79	79	74(67)	--	74	58 (68)	73	86	70	57(69)	72	(68)		
TND329-1RUS	-- 62	--	--	--	--(64)	--	68	55 (59)	60	64	60	--(56)	62	(80)		
Lemhi Russet	--	--	93	91	84(76)	--	--	77 (--)	90	100	--	65(--)	86	(--)		
Russet Burbank	-- 65	86	86	85	72(66)	--	--	71 (--)	90	80	--	60(--)	76	(--)		
Norgold Russet	--	--	77	--	--(--)	--	--	-- (68)	--	74	65	--(64)	72	(66)		
Russet Norkotah	--	--	74	--	--(76)	--	--	59 (68)	--	75	61	--(64)	67	(69)		
Shepody	--	--	82	85	--(69)	--	--	-- (--)	--	--	--	--(76)	84	(73)		
Red LaSoda	--	--	68	--	--(64)	--	--	49 (61)	59	--	63	--(58)	60	(61)		
NDTX8-731-8R	-- 72	74	74	--	--(67)	--	--	-- (--)	--	--	66	--(65)	71	(66)		
Location Means	-- 1.071	81	81	83	76(70)	--	77	63 (73)	77	82	70	61(67)	74	(68)		

U.S. No.2

Entry	& Culls >4 oz % ^{1/}	Common SCAB ^{2/} (2 loc)	Shatter bruise (5 loc) ^{3/}	Hollow heart % ^{4/}	Black- spot (2 loc) ^{5/}	French Fry Color ^{6/}	Sugar Ends % ^{7/}	Dextrose YSI % FWB ^{8/}	Vit.C Mg/100g FWB ^{8/}
AC77101-1	7	R	4.8	19	4.7	2.2	6	0.56	17
AC7869-17	11	R	4.7	7	4.1	1.4	11	0.23	14
AC81198-11	20	R	4.8	9	2.5	2.9	41	0.65	16
BC0038-1	6	R/S	4.1	2	3.0	1.5	7	0.18	10
CO79018-11	15	S	4.3	17	2.2	1.4	4	0.19	19
CO80011-5	8	R	4.7	1	3.6	2.0	2	0.40	18
CO82142-4	9	S	4.9	9	3.7	3.2	10	0.88	15
ND671-4RUS	3	R	4.4	9	3.7	1.8	23	0.39	22
ND1538-1RUS	17	R	4.9	3	4.7	2.1	24	0.41	23
TND329-1RUS	6	--	4.6	1	--	--	--	--	--
Lemhi Russet	9	R	4.7	21	4.8	1.4	7	0.20	13
Russet Burbank	18	R	4.2	2	3.6	1.9	30	0.34	13
Norgold Russet	5	R	4.8	5	--	--	--	--	--
Russet Norkotah	5	R	5.0	1	--	2.6	28	--	--
Shepody	6	MS	--	1	3.1	2.6	11	--	--
NDTX8-731-8R	5	MS	4.7	10	--	3.1	15	--	--
Red LaSoda	8	MS	--	2	--	--	--	--	--
Means	9	--	4.6	7	3.6	2.2	16	0.40	16

1/ Frm omitted, Clv >6oz.

2/ Aberdeen and Prosser: R=resistant, S=susceptible, MS=moderately susceptible, R/S=resistant (Aberdeen)/susceptible(Prosser).

3/ 5.0 (none) to 1.0 (severe); 3 to 5 locations.

4/ Mean of 11 locations including Early Harvest, >12 oz. tubers; includes brown center.

5/ Mean of 2 locations (AB, Kim), 1.0 (lightest) to 5.0 (darkest).

6/ Mean of 4 locations (SLV, AB, Kim, Hrm), out of 45 F storage, <1.0 (lightest) to 4.0 (darkest).

7/ Mean of 4 locations (Ab, Kim, Hrm, Mal).

8/ Aberdeen tubers only, sampled on Oct 22.

Western Table 7. 1990 Merit scores, processing and fresh market, and disposition.

Entry	Merit Score: Processing ^{1/}				Merit Score: Fresh Market ^{1/}							Disposition
	Colo	ID	Ore	Means	Calif	Colo	ID	Ore	Tex	Means		
	SLV	2/	Hrm		Krn	SLV	2/	HRM	Spr			
AC77101-1	3.0	3.0	2.8	2.9	3.0	4.0	4.0	2.0	3.3	3.3	DROP	
AC7869-17	5.0	2.5	2.0	3.2	2.8	5.0	2.5	2.5	3.0	3.3	CONT	
AC81198-11	1.0	2.0	1.0	1.3	--	5.0	3.0	1.0	2.3	2.8	"	
BC0038-1	4.0	4.0	--	4.0	--	5.0	4.0	--	2.7	3.9	RTC	
CO79018-11	4.0	1.5	3.6	3.0	2.8	4.0	1.5	3.0	3.1	2.9	DROP	
CO80011-5	2.0	1.0	2.0	1.7	3.5	5.0	3.5	2.0	3.6	3.5	RTC	
CO82142-4	1.0	1.5	1.4	1.3	3.5	5.0	2.5	1.4	3.0	3.0	CONT	
ND671-4RUS	2.0	2.5	1.0	1.8	--	1.0	4.5	1.4	2.8	2.4	"	
ND1538-1RUS	2.0	2.5	1.0	1.8	3.0	5.0	3.5	1.0	2.9	3.1	"	
TND329-1RUS	--	1.0	1.0	1.0	3.5	--	4.0	3.0	2.9	3.3	DROP	
Lemhi Russet	4.0	3.5	3.3	3.6	--	5.0	3.5	2.5	--	3.7	CHECK	
Russet Burbank	3.0	3.0	2.5	2.8	1.8	2.0	2.0	1.4	--	1.8	"	
Norgold Russet	1.0	--	--	--	--	4.0	--	--	2.6	3.3	"	
Russet Norkotah	2.0	3.0	1.0	2.0	--	3.0	4.0	3.6	2.8	3.4	"	
Shepody	3.0	3.5	--	3.2	--	5.0	2.0	--	--	3.5	"	
NDTX8-731-8R	1.0	1.0	1.0	1.0	3.8	3.0	4.0	1.7	3.4	3.0	DROP	
Red LaSoda	2.0	1.0	--	1.5	3.0	5.0	3.0	--	3.3	3.8	CHECK	
Location Means	2.5	2.1	1.8	2.2	3.1	4.1	3.2	2.0	3.0	3.1		

^{1/} 1.0 (poorest) to 5.0 (best).^{2/} Composite scores for Ab & Kim^{3/} RTC = regional testing completed (3 yrs), CONT = continue in trial, DROP = drop from trial.

COLORADO

D. G. Holm

- Breeding Program** Thirty-two parental clones were intercrossed in 1990. Seeds from 248 combinations were obtained. Sixty seedling families were grown in the greenhouse producing 14,628 tubers for initial field selection in 1991. Surplus tubers will be distributed to Idaho, Oregon, Texas, and Alberta, Canada.
- Seedling tubers were obtained from Dr. J. J. Pavsek, USDA-ARS, Aberdeen, Idaho; Dr. J. Creighton Miller, Texas A&M, Lubbock, Texas; Dr. Dermot Lynch, Agriculture Canada, Lethbridge, Alberta; Dr. Robert Johansen, North Dakota State University, Fargo, North Dakota; and Dr. Kathleen Haynes, USDA-ARS, Beltsville, Maryland.
- Selection Program** A total of 83,250 first-year seedlings were planted, with 840 being selected for further observation. Another 942 clones were in various stages of preliminary and intermediate testing. Two hundred sixteen of these clones were saved for further evaluation. Twenty-five advanced selections (21 russets, 1 red and 3 whites) were selected and will be increased. Another 137 clones were saved for breeding and other experimental purposes.
- Advanced Yield Trial. Thirty-one clones, 26 advanced selections and five cultivars, were evaluated in the advanced yield trial. Results on yield, grade and other characteristics are summarized in Table 1.
- Several clones had acceptable yields (total and US #1) compared to the standard cultivars. Clone C081082-1 will be entered in the 1991 Western Regional Trials.
- Chipping Studies. Forty-two clones, 39 selections and 3 cultivars, were tested for chipping potential after various storage regimes. This information is presented in Table 2.
- None of the clones produced acceptable chips after 7 weeks of 40° F storage. However, some of these clones did produce acceptable chips after reconditioning. Twenty-one selections had color ratings equal to or better than Atlantic and Gemchip (≤ 2.5) after 7 weeks of 50° F and three weeks of 60° F reconditioning.
- Selection C084111-6 will be entered in the Western Regional Chipping Trials in 1991.
- Results of chipping test by Borden, Inc. are given in Table 3. Seven selections produced acceptable chips.

Western Regional Trials. Eight advanced selections from Colorado were entered in the 1990 Western Regional Trials. Entries AC78069-17, AC81198-11, AC83306-1, and C082132-4 will be tested again in 1991. Selection C080011-5 graduated from the regional trials after three years of testing.

Russets with fresh market potential are AC81198-11 and C082142-4. AC78069-1 is a dual purpose russet with fresh market and processing qualities. AC83306-1 is a round white chipping selection.

Results of these trials are presented in the Western Regional Variety Trial report elsewhere in this publication.

Grower Trials. Grower evaluations were conducted on two russets (AC77101-1 and C080011-5), one chipper (AC80545-1), and one long white (BC0038-1). Clones AC77101-1 and BC0038-1 were discarded from further testing.

Growers recommended naming AC80545-1. This clone will be released as a chipper. Grower testing will continue on C080011-5 in 1991 for the third year. Selections to be released for initial grower evaluations in 1991 are AC78069-17, AC81198-11, and C081082-1.

Data on these selections and recently named and standard cultivars are summarized in Table 4.

Colorado Table 1. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for advanced yield trial clones - 1990.

Clone	Yield (Cwt/A)				% Stand	Vine Maturity ¹	Specific Gravity	Stems/ Plant	Tuber Shape & Skin Type ²	
	Total	Total	US #1							
			%	>10 oz						
AC75430-1	474	408	86.1	108	66	97	3.5	1.097	4.0	Ob, R
AC83044-1	413	325	78.8	73	68	98	3.5	1.087	2.6	Ob, R
AC83044-2	426	289	68.5	27	135	99	2.8	1.083	4.3	Ob, R
AC83064-1	518	452	87.3	156	57	98	3.5	1.079	3.7	L, R
AC83064-6	351	269	76.6	35	78	98	3.2	1.082	3.6	L, R
AC83068-1	520	415	79.8	73	90	100	3.2	1.083	4.5	Ob, R
AC83172-1	443	349	78.8	76	89	96	3.0	1.092	4.3	L, R
AC83330-4	500	374	74.5	63	124	98	3.0	1.081	3.2	R, Re
AC84017-3	439	376	85.6	148	39	95	3.0	1.080	3.9	L, R
AC84028-4	402	304	75.6	41	94	99	2.0	1.085	3.6	L, R
AC84069-3	416	294	70.7	40	119	100	3.0	1.086	4.3	L, R
AC84209-8	468	389	83.2	122	54	95	3.5	1.079	3.5	Ob, R
AC84413-4	396	200	50.4	7	192	100	2.8	1.082	8.4	Ob, R
AC84472-1	383	275	71.9	36	63	98	2.0	1.069	4.3	Ob, R
AC84487-1	390	350	89.7	110	38	99	2.5	1.074	4.7	L, R
AC84509-2	474	374	79.1	77	86	98	3.0	1.089	4.6	Ob, R
AC84638-1	476	364	75.7	98	94	98	3.0	1.076	4.2	R, Re
C081082-1	426	384	90.2	114	40	94	3.0	1.074	2.6	L, R
C081095-4	308	229	74.2	29	76	99	3.0	1.098	4.2	Ob, R
C083027-2	492	457	92.8	181	31	99	3.0	1.089	4.5	Ob, R
C084074-2	429	355	82.6	48	69	95	3.0	1.074	3.0	Ob, R
C084205-3	321	288	89.8	117	30	99	3.5	1.086	3.7	Ob, R
C084205-5	416	359	86.2	110	47	100	3.0	1.070	3.9	Ob, R
C084N6-12	409	302	74.0	84	43	95	3.5	1.084	1.9	R, Re
MN10874	448	377	84.2	89	64	100	3.0	1.080	3.4	Ob, R
NDTX9-1069-4RU	420	351	83.6	87	62	95	3.0	1.072	3.3	Ob, R
Centennial Russet	383	320	83.6	35	63	94	3.2	1.078	2.9	Ob, R
Norgold Russet	396	317	80.3	71	78	100	1.5	1.075	5.3	Ob, R

Colorado Table 1. Continued

Clone	Yield (Cwt/A)						Vine Maturity ¹	Specific Gravity	Stems/ Plant	Tuber Shape & Skin Type ²
	US #1			% Stand						
	Total	Total	%	>10 oz	<4 oz	%				
Russet Burbank	368	191	51.7	15	133	96	3.2	1.082	3.2	L, R
Russet Nugget	424	344	81.0	91	80	100	3.8	1.098	3.9	Ob, R
Sangre	483	408	84.5	99	75	99	3.0	1.074	3.9	Ov, Re
Mean	426	338	79.1	79	77	98	3.0	1.082	3.9	----
LSD ³ (0.05)	67	54	4.8	37	27	4	0.6	----	0.8	----

¹ Vine maturity is rated on the following basis: 1=very early; 2=early; 3=medium; 4=late; and 5=very late.

² Tuber shape: R=round; Ov=oval; Ob=oblong; L=long. Skin type: R=russet; Re=red.

³ Least significant difference.

Colorado Table 2. Chip color¹ and specific gravity of San Luis Valley chipping study entries - 1990.

Clone	7 wks 40°F	7 wks 50°F	7 wks/40°F +3 wks/60°F	7 wks/50°F +3 wks/60°F	Specific Gravity
A80559-2	4.0	4.0	3.5	2.0	1.093
AC80545-1	5.0	2.5	4.0	2.5	1.082
AC83306-1	4.0	4.0	4.0	2.0	1.078
AC83311-1	5.0	5.0	5.0	5.0	1.072
AC83311-2	5.0	4.0	4.0	2.5	1.081
AC83311-5	4.5	4.0	5.0	2.5	1.071
AC83368-3	5.0	3.0	4.5	4.0	1.077
AC84601-1	4.0	3.0	3.5	2.5	1.080
AC84610-2	4.0	2.5	4.0	1.0	1.079
AC84610-5	4.5	3.5	1.5	1.5	1.091
AC85438-4	4.0	4.0	2.5	2.5	1.083
AC86385-1	5.0	5.0	5.0	5.0	1.085
AC86395-2	4.0	4.0	4.0	3.0	1.094
AC86421-1	4.5	4.5	4.0	4.0	1.097
AC86422-1	4.0	4.0	2.5	3.0	1.091
AC86433-3	4.5	2.5	2.5	3.0	1.080
AC86444-5	4.5	2.5	3.5	1.5	1.083
AC86449-1	4.0	3.5	2.5	2.0	1.092
AC86449-2	3.5	3.0	1.5	1.0	1.083
AC86452-2	4.5	4.5	5.0	3.5	1.072
AC86452-3	4.5	4.0	4.5	3.0	1.083
AC86452-4	5.0	4.0	4.5	3.0	1.070
AC86458-1	4.5	4.0	4.0	3.5	1.079
AC86463-3	5.0	4.0	3.5	3.5	1.073
AC86489-3	4.5	4.0	4.0	3.5	1.089
BC0894-2	4.0	3.0	3.0	1.5	1.082
C084111-6	5.0	5.0	4.0	4.0	1.093
C086081-1	5.0	5.0	5.0	5.0	1.075
C086106-1	5.0	4.5	5.0	3.0	1.083
C086106-3	5.0	4.5	4.0	2.5	1.078
C086106-4	4.5	4.0	3.5	2.5	1.088
C086125-1	4.0	2.0	4.0	2.5	1.080
C086224-1	4.0	4.0	4.0	3.0	1.083
C086224-4	5.0	5.0	5.0	5.0	1.079
ND651-9	5.0	3.0	4.0	1.0	1.084
ND1995-1	4.0	2.0	2.0	1.0	1.095
ND2008-2	4.0	3.5	1.5	1.0	1.088
ND2109-7	5.0	4.0	3.5	1.0	1.093
ND01496-1	4.5	4.0	3.5	1.5	1.094
Atlantic	4.5	4.0	4.0	2.5	1.093
Gemchip	5.0	4.0	4.5	2.5	1.072
Norchip	4.0	4.0	4.0	1.0	1.078

¹ Chip color was rated using the Snack Food Association 1-5 scale.
Ratings ≤ 2.5 are acceptable.

Colorado Table 3. Chip color¹ and specific gravity evaluations -
Borden, Inc.² - 1990

Clone	Specific Gravity	Nov. 5 ³	Jan. 31 ³
A80559-2	1.092	2.5	2.0
AC80545-1	1.082	3.0	3.0
AC83306-1	1.076	3.5	4.0
AC83311-1	1.074	6.0	7.0
AC83311-2	1.085	4.5	5.0
AC83311-5	1.074	4.5	2.5
AC83368-3	1.076	5.0	7.0
AC84601-1	1.083	3.5	4.5
AC84610-2	1.078	3.0	6.0
AC84610-5	1.090	2.0	1.5
AC85438-4	1.083	3.5	4.0
C084111-6	1.092	2.5	2.5
ND01496-1	1.096	2.5	2.0
Atlantic	1.093	3.5	3.0
Norchip	1.081	3.0	2.5

¹ Chip color was rated using the PCII 1-10 scale. Ratings of 1-4 acceptable, 5 marginal.

² Data collected by Mr. Larry Anderson.

³ Potatoes were harvested September 3-4 and held at approximately 55-60° F prior to chipping on November 5. Tubers were then cooled to 50° F by November 10 for storage.

Colorado Table 4. Comparison of advanced selections with recently named and standard cultivars for yield, grade, specific gravity, and grade defects.

Clone	Usage ¹	Location Years	Total Yield (Cwt/A)	% US #1	Vine Maturity ²	Specific Gravity	% External Defects ³	% Hollow Heart ⁴
Russets								
A78069-17	FM, Fry	4	381	87.8	3.4	1.084	4.4	0.5
AC81198-11	FM	4	444	79.9	3.1	1.079	10.2	0.0
C080011-5	FM	5	363	82.3	2.4	1.074	2.9	0.1
C081082-1	FM	4	352	86.0	2.2	1.075	0.8	0.7
Centennial								
Russet	FM	16	292	77.5	3.1	1.085	1.2	0.6
Frontier								
Russet	FM/Fry	3	271	84.2	1.0	1.094	2.8	0.3
Norgold Russet	FM	9	320	76.2	1.2	1.079	0.4	0.8
Russet Burbank	FM/Fry	17	357	63.6	2.8	1.087	9.1	1.1
Russet Norkotah	FM	5	267	82.6	1.6	1.079	2.3	0.7
Russet Nugget	FM/Fry	8	356	78.6	4.0	1.098	1.8	0.4
Chippers								
AC80545-1	Chip	5	442	82.7	3.6	1.091	3.3	0.1
Atlantic	Chip	4	396	85.5	3.7	1.100	1.5	2.4
Gemchip	Chip	6	397	82.1	3.4	1.090	1.7	0.7
Norchip	Chip	10	328	74.1	1.9	1.083	6.0	0.5

¹FM=fresh market; Fry=french fry.

²Vine maturity: 1=very early; 2=early; 3=medium; 4=late; and 5=very late.

³Includes defects such as growth crack, second growth, misshapen, and green.

⁴Based on tubers greater than 10 ounces.

FLORIDA

J. R. Shumaker, D. P. Weingartner, and Steve Molnar

Variety and Seedling Trials

Methods. Potato varieties and seedlings were tested for their adaptability and desirable horticultural characteristics at the Agricultural Research and Education Center, Hastings, Florida. Clones were grown in advanced Trials (four replications) or intermediate trials (two replications). Temik[®] (3 lb ai/A in-the-row at planting) was applied to all trials. Seed was spaced 12 inches apart in 20 foot single row plots. Between row spacing was 40 inches. The crop was planted on January 29 and harvested May 15-16. Commercial cultural practices were used in all tests. Yield of tubers, their appearance and specific gravity were taken at harvest. Tuber samples were shipped to Berwick, Pennsylvania, for chip color evaluations. The tests were grown under favorable conditions.

Round White and Red Skin Adaptability and Processing Quality Trials. Atlantic (standard chip processing variety), Steuben, AF1060-2, Coastal Chip, B0233-1 and B0179-17 produced the best chip processing traits i.e. acceptable tuber yields, specific gravity and chip color (Table 1). Steuben and AF1060-2 also have highly desirable fresh market traits. Both produced yields comparable to those of La Chipper (standard white skin table variety). AF828-5 has acceptable fresh market traits, but low specific gravity. Both AF828-5 and LA12-59, a red skin clone, are currently being grower tested. Several clones produced highly desirable tuber yields along with either good processing or fresh market traits (Table 2). They will be evaluated in replicated trials during 1991.

Long Russet Adaptability Trials. Several clones produced tuber yields equal to NemaRus (standard long russet variety) (Tables 3 and 4). However, all were considered inferior when compared to the size and shape of the tubers produced by NemaRus.

Florida, Table 1. Results from several clones selected for advanced testing at Hastings, FL -- 1990.

Clone ^{1/}	Size distribution of total US 1A ^{2/} (%)				Total US1-A	Grand total	Tuber appear- ance ^{3/}	Specific gravity	Chip color ^{4/}		
	1	2	3	4					5/18	5/24	5/31
AF 765-5	43	39	16	1	346	376	3.5	1.063	-	-	-
Steuben	17	35	44	4	330	367	7.8	1.075	1	4	6
AF 828-5	29	51	20	0	316	357	7.8	1.064	-	-	-
La Chipper	45	47	9	0	310	334	6.0	1.074	-	-	-
Ontario	36	44	21	0	291	320	5.8	1.075	-	-	-
Red La Soda (R)	39	55	7	0	291	325	5.0	1.062	-	-	-
AF 1060-2	25	44	32	0	291	309	8.0	1.071	1	3	3
Atlantic	21	42	37	0	290	330	7.0	1.084	3	2	2
Sebago	33	48	19	0	287	315	7.3	1.065	-	-	-
Coastal Chip	30	43	26	1	287	307	4.0	1.070	1	3	4
B0233-1	36	57	8	0	285	292	7.5	1.071	1	1	3
Hudson	37	46	17	0	284	301	6.5	1.067	3	5	5
B0179-17	23	49	27	0	284	303	7.3	1.083	1	1	2
Sebago	37	45	18	0	282	309	7.3	1.064	2	2	2
B0184-18	64	34	2	0	280	318	7.0	1.071	2	3	5
LaRouge (R)	42	46	11	0	279	304	5.8	1.065	-	-	-
Atlantic	25	46	29	0	279	298	7.5	1.085	1	1	3
G102-2	48	46	6	0	278	292	7.5	1.076	3	4	4
Reddale (R)	20	42	39	0	275	308	5.3	1.066	-	-	-
B0243-7	37	50	14	0	266	282	5.3	1.071	1	1	3
CS 7635-4	28	54	18	0	259	278	6.0	1.069	-	-	-
Denali	50	47	3	0	257	281	7.3	1.080	-	-	-
LA12-59 (R)	48	37	15	0	250	269	8.0	1.073	2	2	4
LaRouge (R)	45	50	5	0	250	280	5.3	1.066	-	-	-
Norchip	48	45	7	0	244	276	5.3	1.074	-	-	-
La Belle	42	47	11	0	244	270	6.8	1.073	2	3	5
B9792-8B	33	47	20	0	233	248	7.3	1.077	-	-	-
FG-6-15	63	36	2	0	233	247	7.8	1.067	1	4	4
Norwis	43	42	15	0	230	242	6.3	1.062	1	3	2
Oceania	64	32	4	0	220	250	7.8	1.062	-	-	-
F100-1	76	24	0	0	210	230	5.5	1.075	1	1	3
Red Norland (R)	30	45	24	0	210	231	7.3	1.059	-	-	-
Sunrise	68	30	2	0	205	229	7.0	1.071	1	2	2
AF 875-16	52	48	0	0	202	216	7.3	1.085	2	2	4
Somerset	37	53	10	0	198	212	8.0	1.084	1	1	2
CS 7232-4	36	51	13	0	192	224	5.5	1.066	-	-	-
Superior	56	43	0	0	191	203	7.0	1.067	1	3	3
76-31	59	32	10	0	190	209	7.5	1.076	1	2	2
Superior	88	13	0	0	183	204	7.8	1.068	-	-	-
G76-29	68	31	1	0	183	201	7.8	1.077	1	2	6
Allegany	41	40	19	0	182	194	7.0	1.079	2	2	3
Jemseg	48	46	7	0	182	198	7.8	1.072	3	5	5

Florida, Table 1, continued

Clone ^{1/}	Size distribution of total US 1A ^{2/} (%)				Total US1-A	Grand total	Tuber appear- ance ^{3/}	Specific gravity	Chip color ^{4/}		
	1	2	3	4					5/18	5/24	5/31
F24-12	82	15	2	2	178	207	7.5	1.068	1	1	2
G80-3	67	31	2	0	171	189	6.8	1.074	3	4	6
G77-1	90	8	1	0	159	182	6.8	1.077	2	4	3
Redsen (R)	96	4	0	0	158	206	8.0	1.066	-	-	-
F12-5	76	22	3	0	158	177	7.3	1.077	1	2	3
Campbell-13	35	47	18	0	157	179	8.0	1.072	-	-	-
Sangre (R)	93	7	0	0	29	35	5.0	1.064	-	-	-
LSD (.05)	-	-	-	-	56	61	1.1	0.004	-	-	-

^{1/} (R) denotes red-skin clone, otherwise white skin.

^{2/} Size distribution of total US1-A: 1 = 1-7/8 to 2-1/2"; 2 = 2-1/2 to 3"; 3 = 3 to 3-3/4"; 4 = over 3-3/4".

^{3/} Tuber appearance from 10.0 = most desirable to 0.0 = completely undesirable.

^{4/} Chip color: 1-4 = acceptable; 5 = borderline use; 5-10 = too dark for use.

Florida, Table 2. Results from clones selected for intermediate testing at Hastings, FL -- 1990.

Clone ^{1/}	Size distribution of total US 1A ^{2/} (%)				Total US1-A	Grand total	Tuber appear- ance ^{3/}	Specific gravity	Chip color ^{4/}		
	1	2	3	4					5/18	5/24	5/31
B0178-30	30	49	20	1	307	320	7.0	1.082	1	1	2
AF1424-2	19	40	38	3	304	314	8.0	1.068	-	-	-
AF1433-4	24	43	34	0	297	305	7.0	1.069	1	1	2
B0564-6	49	41	10	0	291	323	8.0	1.078	-	-	-
AF1321-1	24	47	30	0	285	362	6.0	1.067	3	5	3
B0176-24	29	43	28	0	276	310	7.0	1.089	-	-	-
B0256-1	32	46	22	0	276	290	6.0	1.083	3	4	4
Sebago	49	41	10	0	268	294	7.0	1.063	-	-	-
AF1424-7	50	46	4	0	265	280	7.0	1.082	-	-	-
Atlantic	31	27	42	0	262	274	7.0	1.078	-	-	-
AF875-15	42	41	17	0	253	264	7.0	1.075	-	-	-
AF1377-2	18	36	46	0	247	264	7.0	1.070	2	4	3
B0566-5	72	26	2	0	247	271	7.0	1.080	2	2	2
B0587-6	47	39	14	0	244	260	7.0	1.086	2	3	4
B0178-35	48	39	13	0	241	260	7.0	1.076	-	-	-
AF1425-1	59	34	7	0	239	263	8.0	1.072	-	-	-
B0587-4	38	42	20	0	237	258	7.0	1.078	-	-	-
B9792-158	69	30	2	0	232	251	7.0	1.067	-	-	-
VW8501-4	40	53	8	0	232	250	5.0	1.083	3	5	5
B0179-6	59	34	7	0	231	251	7.0	1.081	1	4	3
B0596-9	53	36	11	0	231	254	6.0	1.071	-	-	-
AF1424-6	28	49	24	0	231	245	7.0	1.078	2	2	2
B0587-1	67	28	5	0	230	259	5.0	1.088	3	5	5
B0585-1	50	36	14	0	230	271	7.0	1.078	-	-	-
B0595-5	23	51	26	0	226	267	7.0	1.078	2	3	4
CS7697-24	40	37	23	0	224	253	8.0	1.071	-	-	-
AF845-11	37	53	10	0	221	230	5.0	1.072	-	-	-
B0405-6	64	33	3	0	217	238	7.0	1.078	-	-	-
B0257-3	59	36	5	0	216	236	6.0	1.086	3	3	3
AF1377-6	57	39	4	0	216	241	5.0	1.064	-	-	-
BO 405-4	48	46	7	0	215	236	7.0	1.077	-	-	-
AK5-76-168-79	59	36	5	0	211	237	7.0	1.074	-	-	-
B0202-4	42	43	13	2	206	228	7.0	1.074	-	-	-
B0243-10	29	52	20	0	206	220	9.0	1.079	-	-	-
AF875-17	62	38	0	0	205	221	7.0	1.079	-	-	-
AF1331-2	43	48	9	0	202	216	5.0	1.070	-	-	-
B0584-2	60	40	0	0	200	219	8.0	1.075	-	-	-
AF1337-2	47	52	1	0	200	221	5.0	1.063	-	-	-
AF1327-1	70	27	3	0	198	215	7.0	1.063	-	-	-
AF1438-1	79	21	0	0	196	215	8.0	1.073	-	-	-
B0613-2	72	26	2	0	194	226	8.0	1.064	-	-	-
B0616-1 (R)	41	41	18	0	192	206	7.0	1.077	-	-	-

Florida, Table 2, continued

Clone ^{1/}	Size distribution of total US 1A ^{2/} (%)				Total US1-A	Grand total	Tuber appear- ance ^{3/}	Specific gravity	Chip color ^{4/}		
	1	2	3	4					5/18	5/24	5/31
B0256-12	55	39	7	0	191	202	8.0	1.078	-	-	-
B0242-31	52	48	0	0	191	204	6.0	1.065	-	-	-
AF1379-1	79	21	0	0	191	220	8.0	1.076	-	-	-
B0624-1	18	35	48	0	190	207	6.0	1.080	1	4	3
B0178-14	53	38	9	0	188	210	8.0	1.084	3	4	4
B0591-5	81	19	0	0	188	224	7.0	1.063	-	-	-
B0600-6	56	39	6	0	187	205	5.0	1.075	-	-	-
B0590-1	43	42	14	0	186	204	7.0	1.074	-	-	-
B0237-9	42	44	14	0	186	207	8.0	1.067	-	-	-
B9955-10	88	12	0	0	182	220	6.0	1.082	-	-	-
AK3-79-209-81	33	53	14	0	181	206	4.0	1.074	-	-	-
B0608-6	55	36	10	0	180	198	7.0	1.065	-	-	-
AF1431-2	16	43	41	0	179	205	7.0	1.071	-	-	-
AF879-3	70	30	0	0	179	204	6.0	1.077	-	-	-
B0587-9	54	33	13	0	178	197	7.0	1.072	-	-	-
AF1433-3	23	51	26	0	178	187	7.0	1.070	-	-	-
B9933-25	40	59	1	0	177	184	8.0	1.079	1	2	2
AF1431-3	50	39	11	0	176	195	7.0	1.064	-	-	-
B0257-9	29	48	23	0	176	184	8.0	1.085	-	-	-
B9792-2B	66	32	2	0	172	190	6.0	1.079	-	-	-
B0602-1	81	17	3	0	171	209	8.0	1.064	-	-	-
B0588-2	51	42	8	0	169	208	7.0	1.086	-	-	-
Superior	76	24	0	0	167	181	7.0	1.063	-	-	-
B0605-2	68	27	5	0	167	192	7.0	1.079	1	4	3
B0635-7	78	22	0	0	167	183	8.0	1.064	-	-	-
B0613-3	72	26	2	0	167	188	7.0	1.079	-	-	-
B0596-7	70	21	9	0	165	184	6.0	1.077	-	-	-
B0595-2	35	31	34	0	165	182	8.0	1.063	-	-	-
AF1434-2	36	48	16	0	163	172	7.0	1.063	-	-	-
AF1434-1	54	43	2	0	162	177	8.0	1.071	-	-	-
AF1425-2	93	7	0	0	159	193	7.0	1.062	-	-	-
AF1333-1	63	26	11	0	155	177	7.0	1.072	-	-	-
B0586-3	57	43	0	0	152	165	8.0	1.079	-	-	-
B9935-10	80	20	0	0	152	165	7.0	1.071	-	-	-
AF1219-1	54	34	12	0	152	167	9.0	1.061	-	-	-
B0600-2	90	10	0	0	151	191	8.0	1.069	-	-	-
B9792-61	77	23	0	0	151	164	8.0	1.068	1	2	3
AF1302-1	80	20	0	0	151	176	8.0	1.068	-	-	-
AF1425-8	64	34	2	0	148	158	8.0	1.066	-	-	-
ND651-9F	86	14	0	0	146	178	7.0	1.064	1	3	3
B0245-15	59	34	8	0	144	156	7.0	1.079	1	3	3
CS7984-3	87	13	0	0	140	166	8.0	1.068	-	-	-

Florida, Table 2, continued

Clone ^{1/}	Size distribution of total US 1A ^{2/} (%)				Total US1-A	Grand total	Tuber appear- ance ^{3/}	Specific gravity	Chip color ^{4/}		
	1	2	3	4					5/18	5/24	5/31
AK3-79-325-81	86	14	0	0	138	151	8.0	1.069	-	-	-
AF1433-5	70	26	3	0	136	145	7.0	1.080	-	-	-
AF1203-5	84	16	0	0	125	146	7.0	1.072	-	-	-
ND860-2	98	2	0	0	123	164	7.0	1.059	-	-	-
B0608-5	89	11	0	0	122	140	8.0	1.064	-	-	-
AF1379-5	82	18	0	0	119	149	8.0	1.067	-	-	-
ND2224-5R (R)	97	3	0	0	113	150	8.0	1.065	-	-	-
LSD (.05)	-	-	-	-	64	-	-	0.007	-	-	-

1/ (R) denotes red-skin clone, otherwise white skin.

2/ Size distribution of total US1-A: 1 = 1-7/8 to 2-1/2"; 2 = 2-1/2 to 3"; 3 = 3 to 3-3/4"; 4 = over 3-3/4".

3/ Tuber appearance from 10.0 = most desirable to 0.0 = completely undesirable.

4/ Chip color: 1-4 = acceptable; 5 = borderline use; 5-10 = too dark for use.

Florida, Table 3. Results from russet clones selected for advanced testing at Hastings, FL -- 1990.

Clone	Size distribution of total US 1A ^{1/} (%)			Total US1-A	Grand total	Tuber appear- ance ^{2/}	Specific gravity
	1	2	3				
B0324-25	53	36	10	226	260	4.5	1.069
NemaRus	26	41	33	218	234	8.0	1.063
Russette	43	46	12	199	242	5.8	1.076
B0186-1	45	46	9	188	200	6.0	1.074
B0425-5	52	39	9	181	212	7.0	1.064
B0339-1	57	34	10	179	203	6.3	1.068
B0325-5	56	38	6	173	198	6.5	1.075
Norking Russet	49	41	10	173	194	5.3	1.070
B0524-9	82	17	1	130	175	4.0	1.068
BelRus	82	18	1	123	163	7.3	1.076
B0455-8	48	42	10	122	147	6.3	1.068
LSD (.05)	-	-	-	24	27	1.1	0.004

1/ Size distribution of total US1-A: 1 = 2 to 5 oz. (strippers); 2 = 5 to 7 oz; 3 = over 7 oz.

2/ Tuber appearance from 10.0 = most desirable to 0.0 = completely undesirable.

Florida, Table 4. Results from russet clones selected for intermediate testing at Hastings, FL -- 1990.

Clone	Size distribution of total US 1A ^{1/} (%)			Total US1-A	Grand total	Tuber appear- ance ^{2/}	Specific gravity
	1	2	3				
NemaRus	17	45	39	211	251	7.0	1.059
B0311-2	61	29	11	200	253	7.5	1.078
B0310-11	54	37	9	186	218	7.0	1.071
AF1392-16	56	36	9	184	255	5.5	1.066
B0653-8	26	42	32	173	213	5.0	1.066
B0311-12	48	35	16	155	247	6.0	1.075
B0338-5	40	41	19	151	186	5.5	1.075
AF1285-1	90	10	1	149	203	4.0	1.067
B0649-5	37	43	20	145	207	4.0	1.068
B0493-8	71	27	1	141	174	5.0	1.070
AF1392-11	70	27	3	136	197	5.0	1.070
B0309-11	49	44	7	119	140	6.0	1.084
AF1166-4	50	41	9	97	176	5.0	1.058
LSD (.05)	-	-	-	35	41	1.6	0.005

1/ Size distribution of total US1-A: 1 = 2 to 5 oz. (strippers); 2 = 5 to 7 oz; 3 = over 7 oz.

2/ Tuber appearance from 10.0 = most desirable to 0.0 = completely undesirable.

Idaho

S. Love, A. Thompson, D. Corsini, J. Pavek

Replicated Variety Trials

Potato variety trials were conducted at five locations throughout the potato growing areas of Southern Idaho including Rexburg, Shelley, Aberdeen, Kimberly, and Parma. The sites included both production and experiment station fields in locations representing a wide range of environments and soil types. Rexburg and Shelley are commercial production sites with relatively high elevations and short seasons (110 and 120 days respectively). Aberdeen, Kimberly, and Parma are experiment station sites with longer seasons (130, 140, and 150 days, respectively).

The trials were planted between April 18 and May 10, and harvested between September 18 and October 10. Management practices used were common to the respective growing areas and largely conformed to University of Idaho recommendations. Results of the variety trials are summarized in Tables 1-6.

Four chipping-type breeding selections were tested at Rexburg (Table 1). Three of the selections, NDA2031-2, AC80545-1, and A80559-2 produced yields similar to or better than the checks. All three had excellent internal quality characteristics. A80559-2 had exceptionally high specific gravity. NDA2031-2 continued to show the ability to chip from 40°F storage, although small tuber size may be a problem.

The remaining trials were dedicated entirely to testing russet and long white selections for fresh market and processing use. Both the Shelley and Aberdeen Tri-state trials were under heavy early-dying pressure and susceptible varieties produced small-sized tubers and poor yields (Tables 2,3). In Shelley, the lowest yielding clones were Russet Norkotah, ND671-4Rus, and ND1538-1Rus. In Aberdeen, A81473-2 was low yielding due to a low tuber set, not early dying.

The Parma trial location serves as a selection site for sugar-end resistance (Table 4). Stress conditions were exceptionally severe in 1990 due to warm temperatures. Clones expressing the most sugar-end development were A81323-6, Russet Burbank, and A7411-2. Those with the least were A81727-6, Lemhi Russet, NorKing Russet and Shepody. Because of the extreme conditions in this trial, the percentage of U.S. No. 1 tubers was very low. Only two clones A81473-2 and NorKing Russet maintained a high percentage of marketable tubers.

Several breeding selections showed good potential as dual-purpose (fresh and processing) russet-skinned varieties in all or most of the trial locations. These included A7411-2 (currently being released as Ranger Russet), A7961-1, A81473-2, A82119-3, and A84118-3a. These selections were characterized in most trials by high yields, a lack of internal and external defects, high specific gravity and low fry color scores.

Metribuzin Screening

Nine varieties and twenty-four breeding selections were screened for metribuzin sensitivity. Plots treated with metribuzin (post emergence application of 1.0 lb a.i./A) were compared for phytotoxicity symptoms and plant height with hand-weed check plots. Yield loss was predicted using a model constructed from previous years' data.

Several clones showed sensitivity to metribuzin severe enough to be of concern. These included Shepody, A81473-2, A81727-6, A082283-1, Atlantic, and AC83306-1. Others including BC0038-1, C080011-5, C082142-4, TND329-1, NDTX8-731-1R, Gemchip, and Norchip, showed a moderate level of sensitivity.

Idaho Table 1. 1990 Idaho Potato Variety Trial - Rexburg, Idaho.

Clone	Total Yield	U.S. No. 1's					Culls &		Specific Gravity	HH ¹	BS ²	Shatter ³		Fry ⁴ Color
		Yield	%	6-12oz		<4oz	U.S.No. 2	Bruise						
				>12oz	6-12oz									
												--cwt/acre--	-----	
Russet Burbank	363	191	53	6	26	26	21		1.084	5	2.5	3.2	2.7	
Lemhi Russet	321	240	75	10	42	20	6		1.093	0	4.8	3.8	2.8	
Shepody	389	285	73	23	34	11	16		1.087	0	2.3	3.1	3.3	
Russet Norkotah	236	181	77	19	33	14	9		1.068	2	2.2	1.7	3.2	
Frontier Russet	328	261	80	27	41	10	10		1.088	3	1.8	1.2	2.6	
A81323-6	347	268	77	29	35	15	7		1.089	0	3.2	1.2	2.1	
A81727-6	346	240	69	6	38	26	5		1.094	3	3.4	4.7	2.6	
A7411-2	310	257	83	30	38	10	7		1.091	0	3.4	2.2	2.5	
C008014-1	357	277	78	17	41	14	9		1.088	0	2.2	4.3	1.8	
A7961-1	311	228	73	22	36	17	9		1.088	4	4.2	1.2	3.4	
Norking Russet	332	255	77	17	41	17	6		1.082	15	3.0	3.0	2.8	
A74212-1	359	296	82	24	39	12	6		1.091	0	2.7	3.9	3.6	
HiLite	296	243	82	16	48	15	3		1.078	0	2.9	3.4	3.8	
Atlantic	334	275	82	27	37	12	6		1.095	25	1.1	4.5	1.2	
Norchip	303	244	81	14	49	10	9		1.082	2	1.3	3.1	1.1	
Gemchip	339	290	86	31	42	11	4		1.089	5	2.4	2.3	1.3	
NDA2031-2	369	242	66	4	34	32	2		1.088	0	1.2	2.0	1.3	
ND2008-2	259	191	74	8	40	23	3		1.074	8	2.4	4.6	1.1	
AC80545-1	333	251	75	13	43	15	10		1.095	7	2.0	2.3	1.1	
A80559-2	310	200	65	8	34	21	15		1.101	0	1.3	3.9	1.0	
LSD(0.05)	38	42							0.004		0.4	0.6	0.4	

1 Hollow heart was determined by cutting tubers >12 oz.
2 Blackspot bruise 1-5 scale with 1=resistant, 5=susceptible.
3 1-5 scale with 1=resistant, 5=susceptible.
4 USDA fry color score, lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 2. 1990 Idaho Potato Variety Trial - Shelley, Idaho.

Clone	Total Yield	U.S. No. 1's			Culls &		Specific Gravity	HH ¹	BS ²	Shatter ³ Bruise	Fry ⁴ Color
		Yield	%	>12oz	<4 oz	U.S.No. 2					
	--cwt/acre--		-----	%	-----			----			
Russet Burbank	268	142	53	6	25	22	1.083	0	3.2	2.8	1.9
Lemhi Russet	337	228	68	16	20	13	1.084	3	4.9	4.2	1.6
Frontier Russet	283	226	80	17	13	7	1.083	0	2.5	1.0	2.4
Russet Norkotah	157	95	61	6	28	11	1.069	0	3.4	1.1	2.5
NorKing Russet	302	238	79	12	17	4	1.082	4	3.2	2.1	2.0
A7411-2	298	235	79	19	14	7	1.093	0	3.9	1.7	1.9
A7961-1	314	236	75	19	16	9	1.089	0	4.4	1.2	2.0
A81323-6	395	336	85	31	11	4	1.087	0	3.2	1.1	1.2
A81727-6	287	202	70	5	24	6	1.093	2	3.9	4.7	1.5
C008014-1	275	201	73	7	23	4	1.089	0	2.7	2.4	1.1
A74212-1	399	307	77	27	10	13	1.086	0	3.4	2.7	3.0
HiLite Russet	270	185	69	4	30	2	1.081	0	3.4	1.7	3.7
Shepody	255	160	63	15	16	22	1.080	0	2.5	1.5	2.8
ND1538-1Russ	231	156	68	8	23	9	1.079	0	4.3	1.8	2.3
ND671-4Russ	207	142	69	6	30	1	1.078	0	3.6	3.4	2.8
A81473-2	330	282	85	25	8	6	1.089	0	2.2	3.9	1.2
A82119-3	327	261	81	28	10	10	1.090	2	3.7	2.4	1.2
LSD(0.05)	47	42					0.003		0.5	0.6	0.4

¹ Hollow heart was determined by cutting tubers >12 oz.

² Blackspot bruise 1-5 scale with 1=resistant, 5=susceptible.

³ 1-5 scale with 1=resistant, 5=susceptible.

⁴ USDA fry color score, lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 3. 1990 Tri-state Potato Variety Trial - Aberdeen, Idaho.

Clone	Total		U.S. No. 1's		Culls &		Specific	HH ¹	BS ²	Shatter ³		Fry ⁴
	Yield	Yield	%	>12oz	<4 oz	U.S.No. 2				Bruise	Color	
	--cwt/acre--		----- % -----		-----		Gravity	--%				
Russet Burbank	414	195	47	0	16	50	2	1.083	4	4.0	1.9	2.0
Lemhi Russet	378	292	77	2	39	23	0	1.094	40	4.9	1.0	1.3
A81323-6	366	219	60	1	22	40	1	1.086	0	3.6	1.0	2.0
A81473-2	297	262	88	16	52	12	0	1.090	13	2.6	3.8	1.3
A81727-6	385	222	58	0	23	42	1	1.094	0	3.8	1.8	1.1
A82119-3	328	254	77	2	38	23	0	1.088	0	3.7	1.0	1.3
A083037-10	399	353	88	13	57	11	1	1.081	13	4.8	1.6	1.2
LSD(0.05)	34	38						0.004		0.7	0.5	0.3

1 Hollow heart was determined by cutting tubers >12 oz.
2 Blackspot bruise 1-5 scale with 1=resistant, 5=susceptible.
3 1-5 scale with 1=resistant, 5=susceptible.
4 USDA fry color score, lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 4. 1990 Idaho Variety Trial - Parma, Idaho

Clone	Total		U.S. No. 1's			Culls &		Specific Gravity	HH ¹	BS ²	Fry ³ Color	Sugar ⁴ Ends
	Yield	Yield	%	>12oz	6-12oz	<4oz	U.S.No. 2's					
	--cwt/acre--		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Russet Burbank	427	111	26	3	13	19	55	1.074	13	3.1	2.6	84
Lemhi Russet	457	345	75	12	45	11	14	1.083	88	4.4	1.6	14
Frontier Russet	256	186	73	3	45	16	11	1.074	3	2.9	2.7	59
A81323-6	251	34	14	1	7	23	63	1.069	30	3.7	2.3	100
A7961-1	368	207	56	7	34	11	33	1.078	15	3.6	2.3	46
CO08014-1	379	244	64	5	41	14	22	1.070	20	2.0	2.4	54
A82119-3	374	234	63	4	36	23	14	1.075	30	3.3	2.5	43
A81473-2	332	266	80	12	51	12	8	1.080	23	3.4	1.8	40
A81727-6	342	181	53	2	22	42	6	1.089	0	3.3	1.8	2
A7411-2	433	189	44	2	27	18	38	1.086	10	3.3	2.0	75
Shepody	344	262	76	13	47	12	12	1.074	8	2.2	3.1	27
Norking Russet	309	257	83	7	55	14	3	1.068	8	3.6	2.8	17
LSD(0.05)	95	76						0.005		0.5	0.6	

¹ Hollow heart was determined by cutting tubers >12 oz.

² 1-5 scale with 1=resistant, 5=susceptible.

³ USDA fry color score, lower score indicating lighter color; potatoes stored at 45°F.

⁴ Percentage of tubers producing fries with ends rated 3+ and at least one full point darker than the remainder of the fry.

Idaho Table 5. 1990 Advanced Potato Trial - Aberdeen, Idaho.

Clone	Total Yield	U.S. No. 1's		<4 oz	Culls & U.S.No. 2	Specific Gravity	HH ¹	BS ²	Fry ⁴ Color		
		Yield	%								
	--cwt/acre--		----- % -----				----				
A79340-8	304	268	88	37	40	6	6	1.085	2	3.7	1.4
A81386-1	342	301	88	36	40	9	2	1.086	0	3.5	0.9
A8495-1	346	308	89	37	40	6	5	1.090	34	3.0	1.3
A84118-3a	352	306	87	32	41	10	4	1.092	20	1.6	1.6
A84281-5	348	268	77	23	38	16	6	1.082	22	2.5	1.2
A84508-1	300	246	82	26	43	8	10	1.080	5	2.8	2.2
A81323-6	370	326	88	25	42	11	1	1.096	5	3.1	1.4
A81473-2	386	351	91	33	45	8	1	1.090	2	1.8	1.4
A81727-6	332	256	77	10	45	17	6	1.093	4	3.9	1.1
A82119-3	306	278	91	38	39	8	1	1.091	15	3.0	1.3
A7411-2	347	267	77	37	31	7	16	1.093	0	3.1	1.8
A7961-1	329	296	90	40	42	6	4	1.090	20	3.7	2.4
A81779-2	350	266	76	12	39	21	3	1.083	19	3.4	1.9
Frontier Russet	327	291	89	45	35	4	6	1.086	25	2.0	3.2
Lemhi Russet	376	316	84	33	39	10	6	1.089	8	4.3	1.6
Russet Burbank	315	227	72	22	36	12	16	1.080	8	1.9	2.2
LSD(0.05)	42							0.004		0.5	0.5

¹ Hollow heart was determined by cutting tubers >12 oz.² Blackspot bruise 1-5 scale with 1=resistant, 5=susceptible.³ USDA fry color score, lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 6. 1990 Advanced Potato Trial - Kimberly, Idaho.

Clone	Total Yield	U.S. No. 1's		<4oz	Culls &		Specific Gravity	HH ¹	BS ²	Fry ³ Color	
		Yield	%		U.S.No.	2					
		----- --cwt/acre-- -----			----- % -----						
A79340-8	392	353	90	16	54	8	2	1.087	0	3.6	1.6
A81386-1	436	384	88	22	53	10	2	1.074	0	2.6	1.5
A8495-1	392	306	78	8	42	21	1	1.084	0	3.1	3.3
A84118-3a	420	378	90	24	52	9	1	1.090	8	1.6	2.5
A84281-5	364	317	87	36	38	8	6	1.078	28	2.5	2.2
A84508-1	331	278	84	14	52	10	6	1.072	0	2.5	3.7
A81323-6	514	406	79	9	44	19	2	1.088	0	3.2	2.8
A81473-2	535	487	91	24	53	8	2	1.088	12	2.0	3.2
A81727-6	399	283	71	6	40	23	6	1.092	13	3.6	2.2
A82119-3	476	400	84	10	51	13	2	1.086	10	3.2	1.7
A7411-2	494	405	82	24	46	8	10	1.088	18	3.3	2.7
A7961-1	434	369	85	20	44	10	5	1.084	6	3.2	3.3
A81779-2	396	293	74	5	43	25	0	1.069	8	2.8	2.2
Frontier Russet	356	260	73	4	40	26	1	1.081	17	2.9	3.6
Lemhi Russet	484	416	86	25	49	9	4	1.081	18	4.0	2.4
Russet Burbank	412	317	77	12	48	15	9	1.069	2	2.2	3.6
LSD(0.05)	59							0.002		0.4	0.5

¹ Hollow heart was determined by cutting tubers >12 oz.

² Blackspot bruise 1-5 scale with 1=resistant, 5=susceptible.

³ USDA fry color score, lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 7. Reaction of potato clones to metribuzin ¹		
Entry	Plant Damage	Predicted ²
	21 Days Following Application	Yield Reduction Due to Application
-----%		
<u>Russets, Long Whites</u>		
A81323-6	18	0
A81473-2	70	47
A81727-6	78	58
A82119-2	38	9
A083037-10	30	6
AC77101-1	22	0
AC7869-17	18	0
AC81198-11	40	8
A082283-1	72	54
A082611-7	30	7
A083177-6	22	4
BC0038-1	40	14
C079018-11	28	0
C080011-5	35	11
C082142-4	52	18
ND671-4Rus	12	0
ND1538-1Rus	28	4
TND329-1	50	23
Lemhi Russet	28	5
Russet Burbank	12	0
Russet Norkotah	35	8
Shepody (susceptible check)	99	98
<u>Reds</u>		
NDTX8-731-1R	42	11
Red LaSoda	38	8
<u>Chippers</u>		
ATLANTIC	82	68
GEMCHIP	40	14
NORCHIP	40	13
AC83306-1	85	71
ND2008-2	35	8
NDA2031-2	50	20
ND01496-1	22	0

¹ Metribuzin applied postemergence (8 inch plants) at a rate of 1.0 lb a.i./A (17.5 gpa, 30 psi).

² Yield reduction is expressed as a percentage of untreated control plots and was calculated using the model: $[1 - (.820063 + .238239 \frac{\text{Plant height treated}}{\text{Plant height control}} - .000086(\text{Plant damage})^2)] \times 100$

LOUISIANA

J.F. Fontenot, R.G. Shaver, S. Jameson, Jr., W. A. Young, A.W. Fennell, C.G. Fontenot, P.W. Wilson, P.T. Evans, and W.A. Meadows

Introduction

The objectives of the Louisiana potato breeding project are wide adaptability, high yield, tolerance to frost, heat, and drought, insect and disease resistance (particularly late blight and scab); improved culinary quality (including chipping quality, french frying quality, and baking quality); resistance to after-cooking darkening, improved storage ability, better shape and skin color, and resistance to tuber greening. Development of an oblong russet type adapted to Louisiana conditions is highly desirable.

Another objective is to maintain a low glycoalkaloid content of tubers. We feel there is a compelling need to control the sprouting of stored tubers and have them chip satisfactorily from a 4 to 5° C storage and thus eliminate the need for chemical sprout inhibitors. The development of such a cultivar can be accomplished by our breeding methods. The part that dormancy (long or short) plays in this leads to studies which would give greater insight into some of the physiological changes during this period.

The potato, Solanum tuberosum L., is the leading vegetable crop in the world and ranks fourth behind rice, wheat, and corn in economic value among the food crops of the world. The U.S. per capita consumption of this vegetable is over 100 pounds. It is one of the cheapest sources of carbohydrates and furnishes appreciable amounts of vitamins B and C, as well as some proteins. The increase in size, scope, and volume of the potato processing industry has been one of the most important developments in the food field which is coupled with the increase in per capita consumption of processed potatoes in the U.S. No clone exists today that is ideal for all or many of the uses made of potatoes whether in the processed form, or the fresh table stock form. These are some of the reasons that it is foremost to continue the development of improved cultivars.

The fact that potato production can be completely mechanized and can fit into large, as well as small operations is a great benefit. It is predicted that the acreage of potatoes in this state and nation will increase. This could help solve some of the concerns of the American public for both the plight of the farmer at home and the hunger abroad.

Very few southern states have seen fit to include potato breeding as a research project for their state. Since none of these states produce certified seed potatoes, it is of utmost importance that wide adaptability be our primary objective. We are unique in this respect because we realize that unless a new

clone will produce well in the areas of certified seed production (North), it will not be available for southern production, no matter what its producing potential.

The research done under this project is diverse. The following are some areas that have been reported on: Breeding behavior of certain characters in potato progenies; factors influencing the culinary quality of southern and northern grown potatoes; factors affecting chipping ability and amylose content of Irish potatoes; techniques used in screening potato clones for resistance to Streptomyces scabies; suberization studies of the potato; rest period studies including the effect of chemicals and other treatments on rest; the effect of the environment on genetic behavior of potato progenies; the effect of day length upon the vegetative growth, maturity, and tuber characters of the potato; methods and techniques for breeding the Irish potato; factors concerned with aftercooking darkening of Solanum tuberosum L.; the influence of location on the potato ascorbic acid content; and tuber greening of potatoes.

This project is responsible for the development of Red LaSoda, LaRouge and LaChipper. Other cultivars released are Rushmore, DeSoto, and LaSoda. LaBelle, our newest release which was made in 1989, is now available in Nebraska, North Dakota, Wisconsin, Michigan and Maine.

A tremendous amount of research is needed to expand the genetic knowledge of the potato to bring out the potential of it as a food for all people and further increase the economic value of this world's very important crop. A program such as this with different research approaches can help with the exchange of genetic stock for many other potato programs.

Louisiana and Nebraska Trials

The weather conditions in the fall of 1990 at Baton Rouge were ideal for tuber and true seed production. We were successful in making many planned crosses; many of the combinations included 81- 167 (ND860-2xW879) as a male parent. This line is widely adapted, late in maturity, very vigorous, and chips out of cold storage. Some of the outstanding combinations were LaBelle x81-167; 61-22 x 81-167; 81-9 x 81-167 and 81-167 x81-9. True seed from 15 families were seeded in the greenhouse on 10/30/89, transplanted three weeks later and harvested on February 13, 1990. Exactly 249 selections were made at harvest and one tuber from each selection was sent to Scottsbluff, Nebraska for field planting in late May. The duplicate of these selections were planted in Baton Rouge, La. on 9/8/90. Lines that looked good on 10/15/90 in Baton Rouge were 01-45, 01-65, 02-85, 03-90, 02-99, 02-158, and 01-178. Clones rated excellent on 11/2/90 were 02-85, 02-99, 02-113,

01-136, and 02-158. Selections with a long rest period were 02-117, 01-166, and 01-237. Other clones which were rated excellent in the fall of 1990 were LaBelle; 71-13; 81-9; 81-20; 81-167; and 12-59. It was noted that 72-17 and 81-59 had long rest periods. Another important observation was that 81-159 and Atlantic were frost resistant. Several plant introductions were evaluated for possible use in our breeding program. La 12-59 was entered in the North Central Regional Trial and has received very favorable acceptance.

The advanced lines showing promise in Louisiana and Nebraska are 81-20, 81-42, 82-143, 81-167, and 82-185 (Table 1)

Important data on 1989 clones (Table 2) suggest that the following selections have the greatest potential: 91-12, 91-38, 91-53, 91-56, 91-57, 91-60, 91-64, 91-65, 91-73, 91-78, 93-83, 93-84, 93-85, 93-89, 93-94, 91-96, 93-110, 91-113, 91-136, 91-147, 91-160, 92-161, 91-163, 91-164, 91-207, 91-213, 91-218, 91-219, 91-221, 91-223, 91-228, 91-229, 91-234, and 91-237. Several of these clones have a purple skin and could be in demand at specialty markets.

All of the 1990 clones remaining after more research are found in Table 3. Clones showing promise are 01-4, 01-5, 01-18, 01-21, 02-24, 02-28, 01-38, 01-39, 01-42, 01-45, 02-139, 01-210, and 01-240.

True seed from 30 families were planted in the greenhouse on 10-29-90. Approximately 15,000 seedlings were transplanted from 11/12/90 through 11/21/90. At harvest on 2/18/91 through 2/26/91 only 128 clones were considered worthy of further research. These clones will be planted at Scottsbluff, Nebraska in May and in late August at Baton Rouge, Louisiana.

Louisiana, Table 1. Some advanced clones showing promise in Louisiana and Nebraska.

Clone No.	Parentage	Comments	Seed Supply Format
72-11	12-59X	Far's plant & yield, good color	100
72-12	12-59 X		4900
72-13	12-59X	Late, good color and type	1300
72-14	12-59X	Oblong, good color	1200
71-61	G670-11X	Oblong, very good in La., gravity 74	150
71-63	G670-11X	Oblong, flat, very good in La.	4200
*81-4	01-38XND860-2	Specific gravity 1.076, nice in La.	60
*81-9	01-38XND860-2	Specific gravity 1.084	250
81-16	01-38XND860-2	Specific gravity 1.080	20
***81-20	01-38XND860-2	Looked good in La.-Best	100
*81-21	01-38XND860-2	Nice tubers	100
*81-22	01-38XND860-2	Specific gravity 1.079	50
*81-24	01-38XND860-2	Specific gravity 1.085	50
**81-42	01-38XW879	Gravity 1.075, very nice spreading	100
*81-44	01-38XW879	Very good in Neb.	350
81-50	W879X01-38	Gravity 1.076	20
*81-69	51-50XND860-2	Gravity 1.081	100
81-78	W879XND860-2	Fair in La.	20
82-85	ND860-2XW879		50
*81-107	12-59XND860-2		150
81-131	BN9803-1XND860-2		20
81-134	BN9803-1XND860-2	Gravity 1.080	300
**82-143	12-59X	Nice in La.	70
*81-151	BN9803-1X		225
81-152	BN9803-1X		50
*81-159	BN9803-1X	Gravity 1.085	325
*81-161	ND860-2X	Gravity 1.082	225
**81-167	ND860-2XW879	Outstanding parent, very nice	300
*81-179	01-38XW879	Gravity 1.070, nice in La.	20
*81-188	01-38XW879	Gravity 1.087	75
**82-185	12-59X	Nice in La.	300
81-188	BN9803-1X	Gravity 1.075	20
81-189	W879X	Gravity 1.082	20

Louisiana, Table 2. Important data on 1989 clones.

CLONE	PARENTAGE	YIELD	COMMENTS
91-1	01-38XND860-2	1.0	Very Green at harvest in G.H.
91-3	01-38XND860-2	.05	
91-11	51-125XND860-2	0.5	Oblong
*91-12	51-125XND860-2	3.0	
91-16	MS716-15XND860-2	1.0	Uniform
91-17	MS716-15XND860-2	1.0	
91-18	MS716-15XND860-2	0.5	Very nice in La. G.H.
91-22	01-38XND860-2	0.5	
91-23	01-38XND860-2	0.5	
91-24	01-38XND860-2	0.5	Nice in La. G.H.
91-26	01-38XND860-2	0.5	
91-29	01-38XND860-2	0.5	
91-34	01-38XND860-2	0.5	
91-35	01-38XND860-2	0.5	
91-36	01-38XND860-2	1.0	
*91-38	01-38XND860-2	6.0	
91-39	01-38XND860-2	0.5	
91-42	01-38XND860-2	1.0	
91-44	01-38XND860-2	0.5	
91-48	01-38XND860-2	3.5	
91-50	01-38XND860-2	0.5	
*91-53	43-18XND860-2	4.0	
*91-56	43-18XND860-2	5.0	
*91-57	43-18XND860-2	10.0	
*91-60	43-18XND860-2	8.0	
91-62	43-18XND860-2	1.0	
*91-64	43-18XND860-2	3.0	
*91-65	43-18XND860-2	2.0	
91-71	43-18XND860-2	0.5	
*91-73	43-18XND860-2	2.0	
*91-78	43-18XND860-2	3.0	
*93-83	43-18XND860-2	8.0	Nice purple

Louisiana Table 2, continued

CLONE	PARENTAGE	YIELD	COMMENTS
*93-84A	43-18XND860-2	10.0	Nice Purple
*91-84B	43-18XND860-2	2.0	
*93-85	43-18XND860-2	8.0	Nice Purple
93-89	43-18XND860-2	10.0	Nice Purple
93-94	43-18XND860-2	1.0	
*93-96	ND860-2	4.0	
*93-110	43-18 X	5.0	Small purple
*93-113	43-18 X	2.0	
91-116	43-18 X	0.5	
92-119	43-18 X	0.5	
91-122	W879 X	1.0	
91-127	W879 X	1.0	
91-129	W879 X	0.5	
*91-136	ND860-2 X	8.0	
*91-147	01-3 X	6.0	
*91-160	11-20 X	5.0	
*91-160	11-20 X	5.0	
*92-161	ND860-2 X	2.0	
*91-163	ND860-2 X	3.0	
*91-164	ND860-2 X	3.0	
92-165	ND860-2 X	0.5	
91-170	ND860-2 X	1.0	
91-179	ND860-2 X	0.5	
91-183	ND860-2 X	1.0	
91-186	ND860-2 X	1.0	
91-188	ND860-2 X	0.5	
91-192	43-18XND860-2	1.0	
91-207	ND860-2 X	0.5	Excellent in La.
*91-213	ND860-2 X	2.0	
91-214	ND860-2 X	0.5	
*91-218	ND860-2 X	2.0	
*91-219	ND860-2 X	2.0	

Louisiana Table 2, continued

CLONE	PARENTAGE	YIELD	COMMENTS
*91-221	ND860-2X	3.0	
*91-223	ND860-2X	5.0	
91-226	ND860-2X	0.5	
*91-228	ND860-2X	2.0	
*91-229	ND860-2X	3.0	
91-231	ND860-2X	1.0	
*91-234	ND860-2X	2.0	
91-235	ND860-2X	0.5	
*91-237	ND860-2X	10.0	
91-241	ND860-2X	1.0	
91-242	ND860-2X	0.5	

Louisiana, Table 3. Notes taken at Scottsbluff, Nebraska in 1990.

CLONE	YIELD	COMMENTS
01-1	9 oz	Fair vine, oblong, small
01-2	1# 4 oz	Fair vine, oblong, small
01-3	7 oz	Poor vine, oblong, small
01-4	2#	Good vine, round, good set & size
01-5	1# 8 oz	Good vine, round, good set & size
01-6	1# 4 oz	Poor vine, early, long, good set
01-7	11 oz	Fair vine, long, decent set
01-9	8 oz	Poor vine, small, poor
01-10	11 oz	Poor vine, small, decent set
01-11	9 oz	Poor vine, small, poor
01-12	8 oz	Poor vine, small
01-14	1# 3 oz	Poor vine, round, small, decent set
01-15	10 oz	Poor vine, round, small, decent set
01-16	4 oz	Poor vine, round, small, poor
01-18	1# 4 oz	Fair vine, round, good size & set
01-20	6 oz	Poor vine, round, small heavy set
*01-21	1# 5 oz	Poor vine, round, good size & set
01-23	8 oz	Fair vine, long white, poor
*02-24	3# 4 oz	Good vine, strong, good set, light red
02-25	1# 4 oz	Fair vine, good set, light red
02-26	12 oz	Fair vine, small, light red
01-27	1#	Poor vine, oblong, size good
*02-28	1#	Fair vine, good color, size & set
02-29	9 oz	Poor vine, decent size
02-31	1#	Fair vine, good color & size, set fair
02-32	8 oz	Fair vine, heavy set, small, color OK
01-34	13 oz	Fair vine, round white, good set, dead vine
01-35	1#	Fair vine, good set, decent size, dead vine
*01-38	1# 8 oz	Fair vine, long white, good size, decent set
*01-39	1# 12 oz	Fair vine, good size & set
01-40	6 oz	Poor vine, round small, poor

Louisiana Table 3, Continued

CLONE	YIELD	COMMENTS
01-42	2 # 10 oz	Fair vine, big size, good set
*01-45	1# 12 oz	Fair vine, good size, round, heavy set
01-48	9 oz	Good vine, small, heavy set
01-49	9 oz	Fair vine, fair size & set
01-50	1#	Poor vine, oblong, decent size & set, dead vine
01-53	1# 13 oz	Fair vine, round, good set, decent size
01-59	4 oz	Poor vine, not too good
01-60	1#	Poor vine, long, small, decent set
01-63	1# 2 oz	Fair vine, oblong, uniform size, decent set
01-65	1# 8 oz	Fair vine, round good size & set
01-78	9 oz	Poor vine, round, small
02-83	1# 8 oz	Fair vine, fair color, good size & set
02-85	1# 8 oz	Fair vine, good color, size & set
02-92	12 oz	Poor vine, small, good color
02-95	12 oz	Good vine, decent color, fair set
02-97	11 oz	Poor vine, small, good color
02-98	8 oz	Poor vine, small, decent set, color OK
02-100	7 oz	Poor vine, small set & size, color OK
02-106	2#	Good vine, good set & size, good color, dead vine
02-109	1#	Fair vine, heavy set, small, good color
02-100	12 oz	Fair vine, good set, good color
02-111	11 oz	Poor vine, good color
02-113	1# 6 oz	Poor vine, good color, good set & size
02-114	1# 4 oz	Poor vine, good size, set & color
02-117	10 oz	Poor vine, fair set, color OK
02-118	11 oz	Poor vine, fair set, color OK
02-123	4 oz	Fair vine, color fair, not much
02-124	1# 2 oz	Poor vine, color fair, decent size
01-127	12 oz	Poor vine, round white, fair set
03-128	1# 2 oz	Poor vine, purple, decent set & size
01-137	1#	Fair vine, long, fair set
02-138	14 oz	Poor vine, good size and color

Louisiana, Table 3, continued

CLONE	YIELD	COMMENTS
*02-139	1# 12 oz	Fair vine, good color, size, & set
02-140	13 oz	Fair vine, fair set, color OK
02-144	1# 4oz	Poor vine, fair color, & size, dead vine
01-148	9 oz	Fair vine, oblong white
02-156	1# 3 oz	Poor vine, dead, good color, decent set
02-158	1#	Good strong vine, good color & size
01-159	1# 3 oz	Good vine, strong, long white, decent size
01-160	13 oz	Poor vine, long white
01-163	1#	Poor vine, decent size, no set
01-165	9 oz	Poor vine, blight, long white
01-168	3 oz	Good vine, round white, poor
01-169	8 oz	Poor vine, round white, poor
01-172	13 oz	Poor vine, dead, long white
01-173	1# 3 oz	Fair vine, fair set & size
01-183	12 oz	Fair vine, decent set, small
01-186	1# 8 oz	Fair vine, decent set, long
01-187	1# 3 oz	Fair vine, good size
03-193	1# 6 oz	Good vine, strong, good size & set
03-195	1# 13 oz	Poor vine, dead, big, small set
03-196	1# 3 oz	Poor vine, dead, decent size
01-200	1# 8 oz	Good vine, strong, round white
01-202	4 oz	Fair vine, late, small, oblong brown
01-205	1# 6 oz	Poor vine, dead, decent set, good uniform size
01-207	6 oz	Good vine, small, set small
01-209	4 oz	Fair vine, small, long white
*01-210	3#	Decent vine, good size & set
01-213	1# 3 oz	Fair vine, fair size & set
01-215	6 oz	Poor vine, small, round white, late
01-216	1#	Fair vine, late, small
01-220	1# 3 oz	Poor vine, dead, good set, round
01-221	1# 3 oz	Poor vine, dead, good set, fair size
01-222	11 oz	Poor vine, dead, not much
01-224	1# 8 oz	Fair vine, dead, good size & set

Louisiana Table 3, continued

CLONE	PARENTAGE	COMMENTS
01-226	9 oz	Poor vine, fair set, small
01-232	1# 4 oz	Decent vine, good size & set
01-235	1# 10 oz	Decent vine, long white, decent size & set
01-237	1# 4 oz	Poor vine, size & set OK
01-240	2#	Decent vine, good size
01-244	11 oz	Poor vine, dead, fair set, small
01-245	10 oz	Good vine, good set
01-249	1# 6 oz	Decent vine, dead, long white, size & set OK

Maine

G.A. Porter, J.A. Sisson, and M. Buck
University of Maine

Introduction: Forty-nine potato varieties and clones were tested at Aroostook Farm, Presque Isle, Maine, as part of the NE107 Regional Project (Breeding and Evaluation of Potato Clones for the Northeast). The primary objective of this trial is to determine performance, quality, and storage characteristics of promising potato clones and new varieties in Maine.

Methods: Single-row plots, 25 feet long were hand planted on May 16, 1990, using a randomized complete block design and six replications. Seedpieces of round-whites and reds were spaced either eight or ten inches apart, while most russets were spaced 12 inches apart. Russet Burbank seedpieces were spaced 16 inches apart. Plots were located on a Caribou loam soil typical of the area. All varieties were grown following a plowed down timothy/clover sod on a site with a soil pH of approximately 5.2. The early, medium, and red trials were fertilized with 900 lbs/A of 14-14-14, banded at planting. Late and russeted varieties received 1070 lbs/A of the same fertilizer blend. Linuron (1.0 lbs ai/A) was applied on May 26 for broadleaved weed control. Cultural practices were similar to those used on commercial farms in the area, and varieties were grouped so that separate tests could be vinekilled and harvested based on maturity classification. Specific gravity was determined at harvest using the weight-in-air/weight-in-water method. Hollow heart ratings indicate the number of hollow tubers observed per 40 large tubers examined. Chip color evaluations were conducted on December 3 and 5, following storage at 50°F. Chips were fried at 350° F until bubbling stopped and evaluated based on Potato Chip Institute Chart 1206-U.

Results:

General Growth and Plant Stands. Moisture was generally in adequate supply during the 1990 season, and rainfall distribution was quite uniform with the exception of relatively high rainfall during August. Rainfall for May, June, July, August totaled 4.23, 2.84, 4.08, and 5.83 inches, respectively. Rainfall was very heavy during October. Canopy growth was delayed by cool conditions during May. Tuber sizing was delayed, relative to recent years, because of the slow start in canopy growth and because of high temperatures during tuber bulking. Stands were near 90% of maximum for most varieties (Maine Tables 2,4,6, and 8). Serious stand problems were observed for B0175-21 which had 35% stands. LaBelle, F77087, and AF522-5 had stands in the 70% to 80% range. Adequate canopy growth occurred by midsummer in most clones. The following varieties and lines produced small plants and incomplete ground cover: AF879-3, AF845-11, Norland, B0257-9, B0246-7, B0175-21, and BelRus.

Disease Incidence. Chaleur, AF845-11, and B9955-46 experienced significant leaf necrosis and leaf drop during early August. This problem was not observed in any other lines in our trials. It was probably caused by a weak foliar pathogen such as *Alternaria alternata* (personal communication, Dr. Frank Manzer). Early blight became a severe problem for several varieties in the russet trial, but was not observed to any degree in the round-white trials. Early blight lesions were first observed during early September. BelRus and HiLite Russet appeared to be the most susceptible to early blight.

Early Maturity Trial. The outstanding line in the 1990 early trial was NYE55-44 (Maine Tables 1 and 2). It produced significantly higher total and marketable yields than all other lines in the test, including Superior. NYE55-44 produced uniform and attractive tubers for table use, but tuber size was quite small. Its relatively high specific gravity and excellent chip color indicate that the line may be best suited as an early chipping line. None of the other lines produced total yields that exceeded those of Superior; however, marketable yields of Chaleur and B0257-3 were quite high relative to Superior. Despite producing uniform and attractive tubers neither of these lines sized well for tablestock use. Chaleur produces tubers with low specific gravity and does not chip, while B0257-3 has high specific gravity and chips well.

Norchip, AF845-11, AF879-3, B0257-3, B9955-46, and NYE55-44 produced tubers with exceptional chip colors. AF879-3, B0257-3, and NYE55-44 also had high specific gravities; however, NYE55-44 was the only line in this group of potential chippers that produced exceptional yields at early harvest.

Red-Skinned Trial. Four red-skinned varieties were compared with Norland and Chieftain standards (Maine Tables 1 and 2). Chieftain was the highest yielding variety in these trials. LaRouge and Reddale also produced high total yields, but were significantly lower yielding than Chieftain. Marketable yields of LaRouge were quite low because of poor tuber uniformity. Red Gold, Norland, and Sangre were relatively low yielding. With the exception of Red Gold, all of these varieties have low specific gravities. Reddale produces very large tubers, while those of Sangre, Norland, and Red Gold have been consistently small. Tubers of Chieftain and Sangre were quite attractive in these trials, while those of Norland and Reddale were fair in appearance. Sangre's deep red skin color is particularly striking.

Medium Maturity Trial. None of the test clones produced total or marketable yields that exceeded those of Kennebec; however, marketable yields of Saginaw Gold, B0256-1 and F80026 were significantly higher than those of Kennebec (Maine Table 3). B0256-1 produced the highest marketable yields in this test; however, none of the lines produced significantly higher marketable yields than Atlantic. B0257-9, AF875-16, and F77087

were relatively low yielding lines in this test. Kennebec had a very high incidence of misshapen tubers and was the only line in this test that had serious external quality problems (Maine Table 4). Small tuber size limited the potential tablestock utilization of most of these lines. Only Kennebec, LaBelle, and F77087 sized well. Tuber appearances of LaBelle and F77087 were quite good; however, the latter was low yielding. Saginaw Gold, NYE57-13, and F80026 may have potential for table use during growing seasons that allow better sizing of tubers.

Several promising chipping selections appeared in this trial. Excellent chip colors were obtained from Coastal Chip, Saginaw Gold, AF875-15, AF875-16, B0246-7, B0257-9, B9792-158, NYE55-27, NYE57-13, and F77087. Specific gravities of AF875-16, B0256-1, B0257-9, and B9792-158 compared very favorably with those of Atlantic. Yields of Coastal Chip, LaBelle, AF875-15, B0256-1, B9792-158, NYE55-27, and NYE57-13 were all within acceptable limits for chipping selections. AF875-15, B0256-1, NYE55-27, and NYE57-13 may have potential for chipping use in Maine, but these lines need to be evaluated for several more years in regional trials. Yields of AF875-16 were disappointing in this trial; however, based on yield, specific gravity and chip color data over the last two to three years, AF875-16 and Coastal Chip are the most promising medium-maturing, chipping selections in our trials. LaBelle and Saginaw Gold may be useful as dual-purpose varieties with primary use for tablestock and use as chipstock during seasons when these varieties have acceptable fry color.

Late Maturity Trial. The most promising tablestock selections in the late maturity trial were Allegany, AF828-5, AF1060-2, and NY84. These selections generally combine high yields, attractive tuber appearance, and acceptable tuber size (Maine Table 5 and 6). Tuber size of AF1060-2 tends to be smaller than desirable for tablestock use. Allegany, AF828-5, and B9792-8B produced significantly higher total yields than Katahdin, while marketable yields of only AF828-5 and B9792-8B were significantly higher than Katahdin. Chip colors and specific gravities of B0175-20, B0178-34, and B9792-8B were quite good in this trial; however, late vine maturation of B9792-8B makes this line an unlikely candidate for consistent chipping use in Maine.

Russet-Processing Trial. The russeted lines tested during 1990 can be broken into a group of high-yielding lines consisting of Russet Burbank, Frontier Russet, HiLite Russet, Russet Norkotah, and ND671-4 and a low-yielding group consisting of BelRus, AF522-5, and B0220-14 (Maine Table 7). For potential tablestock use, marketable yields and appearance make Russet Norkotah, Frontier Russet, and ND671-4 look particularly outstanding (Maine Tables 7 and 8). None of the lines produced particularly large tubers; however, tubers of Russet Burbank, Frontier Russet, B0220-14, and ND671-4 sized reasonably well. With the exception on ND671-4, specific gravities of all

test lines exceeded those of Russet Burbank. Only BelRus and B0220-14 had light fry colors from storage in December. Based on fry color, tuber size and specific gravity, B0220-14 has the best overall potential for french fry utilization. Its yields would only be competitive with standard varieties at early harvest.

Storage Evaluations. Limited data on storage and processing characteristics were collected from 48 varieties and clones grown during the 1989 growing season (Maine Tables 9 and 10). French fry quality of several selections was evaluated under simulated processing conditions (Maine Table 9). None of these clones produced french fries that were rated superior to Russet Burbank in texture. Texture indices for AF522-5 and B0045-6 were equal to Russet Burbank. Fries from B0045-6 were judged significantly grayer than those of Russet Burbank. Because of poor color uniformity and/or texture, none of the lines produced french fries that were equal to Russet Burbank in quality.

Chip colors from 50°F storage in February were excellent for Coastal Chip, AF875-15, AF875-16, AF875-17, B0257-3, B9792-2B, B9792-61, B9955-11, B9955-33, and B9955-46 (Maine Table 10). AF875-16, AF875-17, B9792-2B, B9792-61, B9955-33, and B9955-46 also produced very light chips directly from 45°F storage. Although none of the selections produced acceptable chips directly out of 38°F storage, AF875-16 reconditioned well from 38°F storage and produced very light colored chips. After-cooking darkening scores were considerably poorer than Katahdin for the following selections: Atlantic, Kennebec, Norchip, Superior, AF875-17, and WF31-4. Washed appearance ratings were particularly outstanding for Atlantic, Norland, Sangre, Superior, AF879-3, B0045-6, NY78, WF31-4, and WNC672-2. Tuber dormancy was exceptionally short for Ontario, Red Gold, B9792-8B, B9955-11, WNC672-2, and 73C26-1. Selections with very low weight loss (approximately 4% or less) from 38°F storage were BelRus, Frontier Russet, HiLite Russet, Russet Burbank, Superior, B0045-6, B0220-14, CS7984-3, F77087, and 73C26-1. Selections with very low weight loss (approximately 5% or less) from 50°F storage were Allegany, Frontier Russet, HiLite Russet, Russet Burbank, Sangre, and CS7635-4.

Overall Summary. Selections from the 1990 NE107 trials that appear particularly promising as late-season, tablestock round-whites are Allegany, AF828-5, and AF1060-2. AF875-16 and Coastal Chip have been our most promising and consistent chipping lines over the past three seasons. AF875-15, B0256-1, B0175-20, B0178-34, NYE55-27, NYE55-44, and NYE57-13 have shown promise for chipping, but further testing of these new lines is needed. Saginaw Gold and LaBelle may have potential for dual-purpose chipping and table use. Frontier Russet was the top performing russeted line for tablestock use. It has not produced good quality french fries in our tests. B0220-14 may be useful for early french fry processing; however, yields have not been competitive with standard varieties at midseason and late harvests.

Maine Table 1. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for early maturing and red-skinned varieties grown at Presque Isle, Maine - 1990.

Variety	Total Yield cwt/A	Mkt. Yield % of std.	Stand %	Size Distribution by Class ¹ (%)						Size Distribution(%)		Specific Gravity	
				1	2	3	4	5	6	1-7/8 to 4 in.	2-1/2 to 4 in.		
Early Test- 104 days													
Superior (std)	207	159	100	91	3	17	33	46	1	0	97	46	1.082
Chaleur	212	186	117	93	7	31	39	23	0	0	93	24	1.078
Norchip	233	135	85	100	16	48	26	10	0	0	84	10	1.084
AF845-11	211	154	97	93	6	28	34	31	1	0	94	32	1.080
AF879-3	201	157	99	90	13	57	21	9	0	0	87	9	1.093
B0257-3	206	180	113	99	9	44	34	13	0	0	91	13	1.096
B9955-46	189	162	102	94	5	18	26	47	4	0	95	51	1.081
NYE55-44	281	242	152	92	4	33	37	26	0	0	96	26	1.088
Waller Duncan LSD (K=100)	31	29											0.002
Red-skinned Test - 111 days													
Chieftain (std)	386	338	100	93	5	23	29	43	0	0	95	43	1.072
LaRouge	329	226	67	86	4	18	23	49	6	0	96	55	1.071
Norland	264	212	63	95	11	39	24	26	0	0	89	26	1.065
Reddale	330	284	84	94	3	8	14	53	22	0	97	76	1.067
Red Gold	265	210	62	94	15	36	26	23	0	0	85	23	1.082
Sangre	264	227	67	92	10	31	30	29	0	0	90	29	1.069
Waller Duncan LSD (K=100)	36	48											0.003

1Size classes for all varieties: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4".

¹Size classes for all varieties: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4".

Maine Table 3. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for medium maturing varieties grown at Presque Isle, Maine - 1990.

Variety	Total Yield cwt/A	Mkt. Yield % of std. cwt/A	Stand %	Size Distribution by Class ¹ (%)						Size Distribution(%)			
				1	2	3	4	5	6	1-7/8 to 4 in.	2-1/2 to 4 in. Gravity		
Medium Test- 111 days													
Kennebec (std)	306	201	100	95	4	13	19	56	8	0	96	65	1.074
Atlantic	271	236	117	90	5	25	34	34	2	0	95	36	1.091
Coastal Chip	268	239	119	97	6	22	30	42	0	0	94	42	1.084
LaBelle	273	244	121	78	4	17	28	45	6	0	96	51	1.085
Saginaw Gold	312	262	130	95	6	27	30	35	2	0	94	36	1.081
AF875-15	262	238	118	98	8	28	31	30	3	0	92	33	1.084
AF875-16	225	210	104	94	6	29	36	28	1	0	94	29	1.093
B0246-7	240	205	102	86	8	34	35	23	0	0	92	23	1.084
B0256-1	299	280	139	95	4	21	32	43	0	0	96	44	1.093
B0257-9	196	172	86	82	6	23	33	37	1	0	94	38	1.092
B9792-158	279	236	117	96	12	38	31	20	0	0	88	20	1.089
F77087	218	203	101	72	2	12	23	58	5	0	98	63	1.079
F80026	315	251	125	89	9	21	28	37	4	0	91	42	1.083
NYE55-27	257	217	108	89	12	45	28	15	0	0	88	15	1.087
NYE57-13	272	222	110	87	14	35	30	21	0	0	86	21	1.078
Waller Duncan													
LSD (K=100)	32	46											0.002

¹Size classes for all varieties: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4".

Table 4. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, and chip color indices for medium maturing varieties grown at Presque Isle, Maine - 1990.

Variety	Plant Data ¹		Tuber Data ¹		Tuber Defects (%)			Hollow Heart Rating ²	Chip Color Index ³			
	Size 8-2	Vine Matur. at 8-23	Vinekill	Matur.	Shape	Appear-ance	Total			Sun- burn	Mis- shapen cracks	Growth cracks
Medium Test- 111 days												
Kennebec (std)	9	6	5	4	5	25.8	2.9	17.7	5.2	0	6.3	
Atlantic	6	5	5	1	7	4.2	0.7	3.5	0.1	0/30	5.0	
Coastal Chip	5	6	6	2	3	6.4	0.5	5.9	0.0	0	3.3	
LaBelle	5	6	5	3	6	6.6	0.4	6.1	0.1	0	5.1	
Saginaw Gold	7	4	4	3	5	7.2	0.8	6.4	0.0	0	3.6	
AF875-15	6	4	4	3	5	6.1	2.1	3.9	0.1	0	3.4	
AF875-16	5	6	5	2	6	3.1	0.7	2.4	0.0	0	2.4	
B0246-7	4	3	4	2	3	4.3	0.2	3.9	0.2	0	4.2	
B0256-1	7	7	7	2	5	1.0	0.2	0.9	0.0	0	5.2	
B0257-9	3	5	5	3	5	1.9	0.8	0.6	0.5	0	3.4	
B9792-158	7	5	5	4	4	2.0	0.7	1.3	0.0	0	3.9	
F77087	5	5	5	4	6	4.8	1.7	3.1	0.0	0	4.0	
F80026	7	5	5	4	5	6.1	0.7	5.4	0.0	0	8.1	
NYE55-27	7	3	4	2	4	2.9	0.6	2.1	0.2	0/20	3.4	
NYE57-13	6	5	5	2	8	3.1	1.7	1.0	0.4	0/30	3.2	

¹See standard NE107 rating system for key to codes.

²Unless otherwise noted, hollow heart rating equals number of hollow tubers found per 40 large tubers cut and examined.

³Chip color indices -- lower indices indicate lighter color: 1-7 acceptable; >7 unacceptable; Waller Duncan LSD (K=100) for chip color = 0.6.

Maine Table 5. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for late maturing varieties grown at Presque Isle, Maine - 1990.

Variety	Total Yield cwt/A	Mkt. Yield cwt/A	Yield % of std.	Stand %	Size Distribution by Class ¹ (%)						Size Distribution(%)		Specific Gravity
					1	2	3	4	5	6	1-7/8 to 4 in.	2-1/2 to 4 in.	
Late Test- 120 days													
Katahdin (std)	338	289	100	92	4	17	26	43	9	0	96	52	1.074
Allegany	377	303	105	90	3	15	23	48	11	1	96	59	1.078
AF828-5	380	365	126	87	3	11	18	53	15	0	97	68	1.074
AF1060-2	352	310	107	87	7	30	27	34	2	0	93	36	1.078
B0172-15	357	317	110	88	1	5	12	55	27	0	99	82	1.081
B0175-20	331	291	101	92	3	16	29	46	5	1	96	51	1.094
B0175-21	197	146	50	35	4	18	25	49	5	0	96	54	1.091
B0178-34	313	267	92	94	7	29	34	29	1	0	93	30	1.089
B9792-8B	376	326	113	98	3	19	31	46	1	0	97	47	1.094
NY78	242	202	70	87	6	23	32	37	2	0	94	38	1.072
NY84	351	292	101	81	5	13	18	45	18	1	95	64	1.067
Waller Duncan													
LSD (K=100)	33	34											0.003

¹Size classes for all varieties: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4".

Table 6. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, and chip color indices for late maturing varieties grown at Presque Isle, Maine - 1990.

Variety	Plant Data ¹		Tuber Data ¹		Tuber Defects (%)			Hollow Heart Rating ²	Chip Color Index ³	
	Size 8-2	Vine Matur. at 9-7 Vinekill	Shape	Appearance	Total	Sun- Mis- Growth cracks				
						burn	shapen			
Late Test- 120 days										
Katahdin (std)	8	7	6	5	8.0	1.7	5.8	0.5	0/35	7.4
Allegany	9	9	7	8	13.8	6.8	6.7	0.3	0	6.0
AF828-5	7	7	6	6	4.4	1.5	2.8	0.2	0	7.8
AF1060-2	8	6	5	7	2.9	1.1	1.8	0.0	0	7.5
B0172-15	8	7	7	5	5.8	0.0	5.7	0.1	1	6.0
B0175-20	8	7	6	5	6.7	0.3	5.2	1.3	1	4.2
B0175-21	4	5	6	4	13.5	0.6	10.1	2.9	1	5.8
B0178-34	8	5	5	5	6.1	0.3	5.4	0.2	0	4.0
B9792-8B	9	8	6	5	6.8	0.1	6.1	0.6	0	4.2
NY78	4	8	6	5	5.4	2.1	2.7	0.5	0	5.8
NY84	7	6	6	6	9.8	1.1	8.7	0.0	0	6.8

¹See standard NE107 rating system for key to codes.

²Unless otherwise noted, hollow heart rating equals number of hollow tubers found per 40 large tubers cut and examined.

³Chip color indices -- lower indices indicate lighter color: 1-7 acceptable; >7 unacceptable; Waller Duncan LSD (K=100) for chip color = 0.6.

Maine Table 7. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for russeted or processing varieties grown at Presque Isle, Maine - 1990.

Variety	Total Yield cwt/A	Mkt. Yield % of		Stand %	Size Distribution by Class ¹ (%)					Size Distribution(%)		Specific Gravity
		cwt/A	std.		1	2	3	4	5	over 8 oz.	over 12 oz.	
Russet/Processing Test- 120 days												
R. Burbank (std)	294	216	100	99	20	54	22	4	0	26	4	1.079
BelRus	208	199	92	99	37	54	8	1	0	9	1	1.087
Frontier Russet	308	264	122	93	24	55	17	3	1	20	4	1.083
HiLite Russet	303	255	118	93	46	49	5	0	0	5	0	1.080
Russet Norkotah	312	276	128	99	28	58	12	2	0	14	2	1.080
AF522-5	230	219	101	71	45	51	3	1	0	4	1	1.093
B0220-14	215	178	82	91	18	61	18	2	0	21	2	1.083
ND671-4	293	241	112	90	28	51	19	1	1	21	3	1.073
Waller Duncan												
LSD (K=100)	32	41										0.002

¹ Size classes for all varieties: 1=0 to 4 oz.; 2=4 to 8 oz.; 3=8 to 12 oz.; 4=12 to 16 oz.; 5=over 16 oz.

Maine Table 8. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, and chip color indices for russeted or processing varieties grown at Presque Isle, Maine - 1990.

Variety	Plant Data ¹		Tuber Data ¹		Tuber Defects (%)			Hollow Heart Rating ²	Chip Color Index ³
	Size 8-2	Vine Matur. at 9-7	Shape	Appear-ance	Total	Mis-shapen cracks			
						Sun-burn	Growth cracks		
Russeted/Processing Test- 120 days									
R. Burbank (std)	8	8	8	3	23.1	0.2	23.0	0	7.9
BelRus	2	6	6	6	3.8	0.0	3.8	0	4.8
Frontier Russet	6	7	6	5	12.3	0.3	11.2	0	8.0
HiLite Russet	4	5	5	4	12.7	0.0	12.7	0	8.0
Russet Norkotah	5	4	7	7	9.6	0.0	9.6	0	8.4
AF522-5	5	5	3	5	7.6	0.2	7.2	0	7.2
B0220-14	4	4	5	5	16.8	0.1	16.3	1	4.0
ND671-4	7	5	6	6	12.6	0.0	12.5	1	8.0

¹See standard NE107 rating system for key to codes.

²Hollow heart rating equals number of hollow tubers found per 20 large tubers cut and examined.

³Chip color indices -- lower indices indicate lighter color: 1-7 acceptable; >7 unacceptable; Waller Duncan LSD (K=100) for chip color = 0.4.

Maine Table 9. French fry color and texture of selected potato clones and varieties under simulated processing conditions.¹ All varieties were grown at Presque Isle, Maine during 1989.

Variety	Color Grade ² Rating Index	Grayness ³ Index	Mealiness ⁴ Index	Comments ⁵	Overall Rating ⁶
Russet Burbank (std)	0	2.0	4.8	U	0
BelRus	0	2.0	4.2	U	-
Frontier Russet	0	2.0	3.1	U	-
HiLite Russet	0	2.0	3.6	Ir, Be	-
AF522-5	1	3.1	4.3	Ir, Bl, Be	-
B0045-6	0	2.0	4.6	Bl, Bc	-
B0220-14	0	1.8	4.2	Ir, Be	-
CS7984-3	0	2.0	3.2	Ir, Bl	-
Waller Duncan LSD (k=100)	0.5	0.2	0.6		

¹Two center raw tuber slices were cut from each of ten tubers. The slices were rinsed in cool water, blanched for 8 minutes at 170°F, par-fried at 375°F for 80 seconds, and quick frozen at -22°F in plastic bags. Four such replications were processed and held at 5°F until evaluation. Prior to evaluation, samples were finish-fried at 360°F for 2-1/2 minutes, blotted dry with a paper towel, and cooled for 6 minutes. All samples were processed and evaluated by the Department of Food Science (T. Work), University of Maine, Orono, ME. Blanching and par-fry were conducted on January 10, 1990. Finish-fry and evaluations were conducted on January 11, 1990. All tuber samples were stored at 50°F, 85% R.H. from harvest until processing.

²Color Grades are from U.S.D.A. color standards chart #64-1, third edition.

³Grayness indices represent weighted means derived from the following evaluation scale: 4 = no graying; 3 = slight graying; 2 = moderate graying; 1 = intense graying.

⁴Mealiness indices represent weighted means derived from the following evaluation scale: 5 = dry, mealy; 4=mod. mealy, slightly moist; 3 = slightly mealy, mod. moist; 2 = soggy, not mealy; 1 = very soggy, not mealy.

⁵Comments: U = uniform fried color; Ir = french fries were irregular in color; dark blotches detracted from appearance of product; Be = Dark blotches on ends of many fries; Bc = Dark blotches in centers of many fries; Bl = general blotchy appearance of fries.

⁶Overall rating: french fry quality rated better (+), not different (o), or poorer (-) than Russet Burbank.

Maine Table 10. Chip color from 38°F, 45°F, and 50°F storage, reconditioning potential, after-cooking darkening indices, washed appearance ratings, days to sprout formation, and storage weight losses at 38°F and 50°F for 47 potato varieties grown at Presque Isle, Maine during 1989 and stored during the 1989-1990 storage season.

Variety	Chip Color from Storage ²			After-Cooking Darkening ³	Washed Appearance Index ⁴	Days to Indicated Sprout Length ⁵	Storage Wt. Loss %	
	50°F ¹	45°F ¹	38°F ¹				38°F	50°F
Allegany	7.2	7.5	-	8.0	18(6)SB,SS,B,SK	125	4.6	4.7
Atlantic	7.4	7.1	10.0	7.6	42(8)SB,B	104	7.7	10.7
BelRus	6.8	-	9.9	8.7	43(5)NR,SZ	111	3.9	8.1
Chaleur	-	-	-	8.0	19(6)BS	117	7.2	10.4
Coastal Chip	4.8	5.8	9.8	8.8	19(5)PC,SS,B	97	5.2	14.3
Eramosa	-	-	-	8.4	3(4)PC,SS,B,SZ	138	7.3	11.6
Frontier Russet	9.2	-	-	8.8	34(6)SB,SS	118	2.9	5.0
HiLite Russet	8.1	-	-	8.8	17(5)NR,SS,B,P	104	2.6	4.8
Katahdin	8.8	8.6	-	8.4	10(6)SB,B,SK	104	9.6	11.9
Kennebec	7.1	7.1	-	7.9	15(6)PC,SB,RS,SS,B	118	9.3	8.5
LaBelle	7.2	6.9	9.8	8.1	16(7)SS,BS,B	104	6.2	11.0
LaRouge	-	-	-	8.2	4(4)PC,SS,BS	132	8.1	10.3
Norchip	5.6	5.5	9.3	7.8	5(4)M,PC,SS,SZ	117	8.6	10.2
Norland	-	-	-	8.2	46(7)SS,B,SZ	111	6.5	18.0
Ontario	-	-	-	8.2	12(3)M,PC,SB,PE	62	8.9	10.2
Red Gold	-	-	-	-	33(6)PC,SS,BS,SZ	88	7.5	16.5
Russet Burbank	7.8	-	-	8.4	3(3)M,B	132	2.8	4.9
Saginaw Gold	6.7	6.1	-	8.2	2(3)M,PC,SB,RS,SS,BS,B	132	6.9	7.4
Sangre	-	-	-	8.4	50(7)RS,SZ	132	5.7	5.1
Superior	7.4	6.2	9.7	7.7	43(7)SZ	131	8.7	10.1
AF522-5	9.0	-	-	8.6	22(5)NR,SS,B,SZ	111	2.2	7.0
AF828-5	-	-	-	8.4	17(7)SS	104	7.2	11.3
AF845-11	6.4	6.1	9.7	8.0	20(5)M,SS,B	124	9.6	12.6
AF875-15	5.2	5.8	8.9	8.6	3(4)M,PC,RS,SS,BS,SZ	104	6.0	14.2
AF875-16	2.8	3.0	9.0	8.5	7(5)PC,B,SZ	104	6.7	8.6

Maine Table 10 cont.

Variety	Chip Color from Storage, ²		After-Cooking Darkening ³	Washed Appearance Index ⁴	Days to Indicated Sprout Length ⁵	Storage Wt. Loss % ⁶	
	50°F ¹	45°F ¹				38°F	50°F
AF875-17	4.8	4.4	7.9	7(5)SB,SS,B	118	5.8	9.1
AF879-3	6.4	6.0	8.1	45(7)B,SZ	131	8.1	12.4
AF1060-2	-	-	8.0	12(6)M,SB,RS,SS,B	104	8.9	10.3
B0045-6	7.9	-	8.8	43(6)B,SZ	104	3.9	12.8
B0172-15	6.5	6.9	8.3	6(5)RS,B	97	8.2	9.4
B0220-14	5.7	-	8.9	12(4)PC,NR,BS	104	4.2	8.6
B0257-3	5.3	5.2	8.0	40(6)SZ	138	8.6	11.3
B9792-2B	4.0	4.3	8.5	14(4)M,PC,SS,BS,B,DR	97	5.4	12.7
B9792-8B	6.5	5.8	8.2	0(4)PC,SB,SS,B	69	7.1	9.2
B9792-61	4.3	4.6	8.4	20(5)PC,SS	117	8.1	14.1
B9792-158	6.0	6.5	8.2	13(7)SB,B	104	5.1	15.1
B9955-11	4.2	6.2	8.5	3(4)M,PC,SS,B	83	6.2	15.7
B9955-33	3.8	4.2	8.0	3(4)PC,SB,SS,BS,B,SZ,AC	97	7.8	8.2
B9955-46	4.3	5.0	8.1	0(2)M,PC,RS,SS,B	104	7.2	8.0
CS7635-4	7.3	8.0	8.1	3(5)PC,RS,SS,B	125	4.5	4.9
CS7697-24	-	-	8.0	33(6)SB,SS,B,SZ	124	9.7	10.4
CS7984-3	8.1	-	8.9	8(4)SS,B	104	3.5	10.6
F77087	5.6	6.0	8.0	9(5)PC,SB,RS,SS,B,SZ	125	4.2	7.3
NY78	-	8.4	8.6	58(8)B	104	5.6	11.8
WF31-4	6.7	6.7	7.9	47(7)RS,BS,SZ	104	7.1	10.2
WNC672-2	7.2	6.9	8.0	49(7)B	76	4.5	6.5
73C26-1	7.9	6.9	8.1	9(4)PC,RS,SS,SZ	88	4.2	13.0

¹Stored at 38°F, 45°F or 50°F, 85% R.H. from harvest until mid-February. Chip colors: 1-7 acceptable, >7 unacceptable. Lower indices indicate lighter color.

²Reconditioned samples were taken from 38°F and placed at 70°F for a 3-week period starting on January 8, 1990. Chip color rating scale: 1-7 acceptable, >7 unacceptable.

³Samples were stored at 45°F, 85% R.H. from harvest until March 14, 1990, and were then warmed to 65°F for 96 h. Diced tubers were blanched for 5 min., cooled to 120°F, then rated after 30 min. with a Munsel

Neutral Color Scale. Higher indices indicate lighter color.

⁴Unreplicated samples weighing approximately 7500 grams were stored at 45°F and 85% R.H. until mid-January. Tubers were then washed and graded. First number indicates % bright, attractive and uniform tubers in sample. Numbers in parentheses indicate subjective appearance of the sample using standard NE-107 appearance code. Codes indicate major external defects as follows: M=misshapen, NR=nonuniform russetting, PC=poor color, SB=sunburn, GC=growth cracks, CS=common scab, SS=silver scurf, RS=russet scab, DR=dry rot, SR=soft rot, BS=black scurf, LE=enlarged lenticles, B=bruises, BH=buttonhole, PS=pitted scab, SZ=small tuber size, ST=stolons adhere to tubers, SC=skin cracks, PE=pink eye, SK=skinning, AC=air cracks, and P=pear-shaped.

⁵Tubers were stored at 45°F, 85% R.H.

⁶Percentage sprout and weight loss following storage from harvest until March 21, 1990, at indicated temperature and 85% R.H.

Maine -- 1990

Alvin F. Reeves, Robert B. Long, Garland S. Grounds,
R. Alan Henn, and Arnold A. Davis.

Potato Breeding

Seed and seedling production. Emphasis continues in two areas: the development of a long russet processing variety and the development of scab-resistant round white table varieties. A total of 17 parent plants were intercrossed in 24 different combinations to produce 27,200 seeds. An additional 360,600 seeds were obtained from 29 field plantings. Greenhouse plantings of true seeds yielded 43,093 seedlings from which 32,352 tubers were harvested.

Seedling selection. A total of 190 (0.6%) new selections were saved from 31,850 single hills. From the 307 12-hill plots, 63 (20.5%) were saved for further testing. One-hundred-sixteen 60-hill plots, and 75 advanced selections were maintained and tested.

Protoclonal selections. Field testing of clones derived from Russet Burbank leaf cells included replicated yield tests of twelve of the advanced protoclones. Nine were equal to the standard Russet Burbank in yield, and eleven were equal in specific gravity.

Disease tests. In cooperation with Drs. Franklin Manzer, Richard Storch, Bill Brodie, Robert Goth, Gilbert Banville and Simeon Leach, a number of selections were tested for resistance to several diseases. All tests were inoculated either directly or on spreader rows within the plots. Results were as follows: two of 107 selections tested were resistant to late blight; 14/149 to early blight; 21/121 to acid scab; 30/113 to common scab; 107/113 to net necrosis; 16/61 to leafroll; 47/130 to Verticillium; 10/49 to golden nematode; 4/14 to Fusarium roseum; 4/14 to Fusarium solani; and 2/3 to soft rot.

Physiological disorders. Additional tests for physiological disorders showed 12 of 29 resistant to hollow heart; 18/31 to blackspot bruising; and 10/18 to shatter bruising.

Yield tests. A total of 75 selections were grown in replicated yield tests in 1990. Eight yielded better than the control varieties and 39 had higher specific gravities. Early maturing selections were given 120 pounds of nitrogen per acre and killed at 93 days from planting; medium-early maturity selections were killed at 98 days. Medium-late maturing selections were given 140 pounds of nitrogen and killed at 104 days. Late maturing selections were given 160 pounds of nitrogen and killed at 112 days.

Chip tests. After processing in December, February, and April from five different storage temperatures, nine selections had better average chip color than Monona: AF 875-16, AF 1424-1, AF 1424-6, AF 1424-7, AF 1433-3, AF 1433-4, AF 1433-5, CS 7232-4, and Somerset.

Processing and Cooking tests. Terry Work (Food Sciences Department of the University of Maine, Orono) conducted french fry tests of 15 selections, and cooked quality tests for ten selections from 1989 plantings. Three selections were better than Katahdin in three of the six qualities measured, and four other selections were rated poorer than Katahdin in only one of the six qualities. The best selection was AF 828-5, which was rated better in two qualities and equal in all others.

Commercial Trials

Grower trials of advanced selections. Eight unnamed selections were grown on commercial farms in 1990. Results were promising for most of them, and two will be named in 1991.

Russets: AF 465-2 continued to show hollow heart and will be dropped.

Chipping selections: CS 7232-4 had very poor yields in 1990, but testing will continue because of excellent chip color from storage. AF 875-16 will be named MaineChip in 1991. AF 879-3 was too small, and has been dropped from NE-107 testing.

Round white table varieties: Suberized seed of CS 7697-24 gave good stands and yield with only 4% culls; however, fresh cut seed gave poor stands. CS 7635-4 performed well with reduced fertilizer in 1990, and will be named Prestile in 1991. AF 828-5 had high yields, good size, and very white flesh. AF 1060-2 gave high yields with uniform sizing and only 1% culls.

Maine Table 1 summarizes the advanced selections in the Maine potato breeding program.

Maine Table 1. Characteristics of advanced selections from the Maine potato breeding program.

Pedigree

Resistance to $\frac{5}{-}$

	Maturity $\frac{1}{-}$	Skin color $\frac{2}{-}$	Tuber type $\frac{3}{-}$	Yield $\frac{4}{-}$	Cooked quality $\frac{4}{-}$	Chip color $\frac{4}{-}$	Percent dry matter $\frac{4}{-}$	Storage qualities $\frac{4}{-}$	Bruising $\frac{4}{-}$	Hollow Heart $\frac{4}{-}$	Virus X	Leafroll	Net necrosis	Late blight	Early blight	Acid scab	Common scab	Verticillium	Golden nematode
Round white tablestock																			
Early Maturing																			
AF1203-5	ME	CN	R	A	F	A	G	F	U	E	F	F	R	S	S	S	M	M	R
AF1327-1	E	WN	R	A	M	U	M	F	E	E	F	S	R	S	S	S	M	R	S
AF1331-2	M	W	RO, fl	E	F	U	A	F	E	G	F	S	R	S	S	S	M	M	S
AF1333-1	E	W	RO	G	A	U	M	F	E	M	F	F	R	S	S	M	R	M	S
AF1437-1	ME	WCN	R	G	F	M	U	F	A	A	F	S	R	M	M	S	S	S	S
AF1438-4	E	WN	R	G	F	M	M	F	A	E	F	S	R	S	S	S	S	S	S
AF1445-3	ME	W	R	E	F	U	U	F	G	A	F	R	R	S	M	S	S	S	S
CS7697-24	E	W(C)	R(O)	G	G	M	M	G	A	G	S	F	R	S	S	S	S	M	S
Mid Season																			
AF828-5	ML	W	RO	G	G	M	M	G	E	E	S	S	R	M	R	S	S	M	R
AF1060-2	L	W	R	E	A	U	A	G	E	E	S	S	R	M	R	S	S	R	S
AF1302-1	M	W!	R	G	G	U	U	F	M	M	F	R	R	S	S	S	M	R	S
AF1426-1	M	C	RO	G	F	G	A	F	G	A	F	S	R	R	R	S	S	S	S
AF1431-2	M	WN	R	A	F	M	A	F	M	A	F	S	R	M	R	M	S	S	R
AF1438-1	M	W	RO	G	F	G	A	F	E	E	F	S	R	M	M	S	M	S	S
AF1438-5	ME	WN	R	E	F	M	U	F	A	E	F	S	R	M	M	R	R	S	S
AF1438-6	ME	WN	R	E	F	U	U	F	A	E	F	S	R	S	S	S	S	S	S
Full Season																			
AF756-5	L	W	RO, fl	E	G	U	U	F	E	U	F	S	R	M	R	M	M	M	S
AK3-79-209-81	ML	W	OR	G	A	U	A	F	E	G	F	S	R	M	M	M	M	R	S
AK3-79-235-81	M	W	O(L)	A	G	U	A	F	E	M	F	S	R	S	R	M	M	M	S
AK5-76-168-79	L	WN	R, fl	A	M	M	G	G	G	G	F	S	R	M	M	M	S	R	S
CS7635-4	L	W	RO	G	M	M	G	G	M	M	R	S	R	S	M	M	M	M	S
(Prestile)																			

Maine Table 1. Continued

Pedigree

Resistance to 5/

	1/ Maturity	2/ Skin color	3/ Tuber type	4/ Yield	4/ Cooked quality	4/ Chip color	4/ Percent dry matter	4/ Storage qualities	4/ Bruising	4/ Hollow Heart	Virus X	Leafroll	Net necrosis	Late blight	Early blight	Acid scab	Common scab	Verticillium	Golden nematode
Long russets for processing or count box																			
AF1166-4	ME	R	O	G	F	M	M	F	G	M	F	F	R	S	R	S	M	R	S
AF1285-1	ME	LR	O	G	F	U	M	F	G	G	F	S	R	S	S	S	S	S	R
AF1337-2	ME	BN	O	G	F	U	M	F	E	E	F	S	R	S	S	M	M	M	S
AF1367-9	ME	DC	OL	A	F	U	M	F	E	M	F	S	R	S	M	S	S	M	S
AF1367-11	ME	R	OR	A	F	U	M	F	E	E	F	F	R	S	S	S	S	S	S
AF1390-1	M	W/R	OL	G	F	U	U	F	E	A	F	S	R	R	M	S	S	M	S
Chipping types																			
Somerset	ME	WC	OL	A	A	E	G	A	A	A	S	S	R	R	R	S	S	S	S
AF845-11	M	B	R	G	G	G	E	F	A	G	S	S	R	S	M	M	S	S	S
AF875-15	ME	C	R	A	G	G	E	F	G	E	F	S	R	S	S	M	R	M	S
AF875-16	ML	W	R	G	G	E	E	A	G	G	S	S	R	S	S	M	S	R	S
(Maine Chip)																			
AF1377-6	M	W	R	A	F	G	G	F	A	A	F	F	R	M	M	S	S	S	F
AF1424-1	L	W	R	M	F	E	G	F	E	E	F	F	R	R	R	M	S	S	S
AF1424-6	M	WC	R,fl	M	F	E	E	F	G	E	F	R	R	M	M	M	S	S	S
AF1424-7	ME	W	R	A	F	E	E	F	E	E	F	S	R	M	M	S	S	S	R
AF1433-4	E	W	R	A	F	E	A	F	G	A	F	F	R	M	M	S	S	R	R
AF1433-5	M	W	R	M	F	E	G	F	A	M	F	S	R	R	R	S	S	S	S
CS7232-4	E	WC	R	M	G	E	G	G	E	E	S	S	R	S	S	M	M	S	S

1/ E = early, M = medium, L = late.

2/ W = white, C = cream, B = buff, R = russet, N = netted, L = light.

3/ R = round, O = oblong, L = long, fl = flat.

4/ Rated as U = unacceptable, M = marginal, A = acceptable, G = good, E = excellent, F = further testing needed.

5/ R = resistant, M = moderately resistant, S = susceptible, F = further testing needed.

MICHIGAN

R.W. Chase, D.S. Douches, K. Jastrzebski, R.B. Kitchen and
G.H. Silva

I. 1990 POTATO VARIETY EVALUATIONS

The objectives of the evaluation and the management studies are to identify superior varieties for fresh market or for processing and to develop recommendations for the growers of those varieties. The varieties were compared in groups according to the tuber type and skin color and to the advancement in selection. The most promising varieties were tested in management profile studies for their reaction to the spacing and nitrogen fertilization. Total and marketable yields, specific gravity, tuber appearance, incidence of external and internal defects, chip color, consistency and after cooking darkening as well as susceptibilities to common scab and bruising were determined. Before testing for chip color, the varieties were stored at 45 and 50°F. Samples to be tested for bruising were stored at 40°F.

The field experiments were conducted at the Montcalm Research Farm in Entrican. They were planted in randomized complete block design, in four replications. The plots were 23 feet long and spacing between plants was 12 inches. Inter-row spacing was 34 inches.

Both round and long variety groups were harvested at two dates. The yield was graded into four size classes, incidence of external and internal defects was recorded, and samples for specific gravity, chipping, bruising and cooking tests were taken. Chip quality was assessed on 20-tuber samples, taking one slice from each tuber. Chips were fried at 365°F. The color was measured with E-10 Agtron colorimeter. Prior to chipping, the tubers were stored at 45 and 50°F. Texture and after cooking darkening were assessed on five tuber samples. For the bruising test, the 20-tuber samples were stored at 40°F. Tubers were artificially bruised in a wooden drum after three months storage. After treatment, the tubers were stored three days for blackspot development and were peeled prior to bruise examination. Unbruised samples served as control.

ROUND WHITE VARIETIES

Results

Eleven varieties and five breeding lines were tested in the trial. Onaway, Atlantic, Eramosa and Superior were planted as checks. The results are presented in Tables 1 and 2. The average yield level was high, but lower than in 1988-89. Onaway was consistently the top yielder in all three years at the first date of harvest. Its yield at second date of harvest was only slightly higher than at first date with high internal quality. Steuben was consistently good for the past

three years at both harvest dates. The difference in yield between the two harvest dates was large. Steuben therefore is late, but early bulking. Steuben had better appearance than Onaway, higher specific gravity and acceptable chipping quality. It has a good potential in Michigan, both for fresh market and chipping industry. Snowden confirmed its potential as a chipping variety, however, it showed a susceptibility to blackspot bruising. Saginaw Gold, MS700-70 and MS716-15 produced satisfactory yields and their chipping quality was good. They appear superior to Atlantic in the overall rating. All varieties did not darken immediately after boiling. However, after one hour some of them were unacceptable. These were: Steuben, ND2224-5 and Coastal Chip. Some sloughing was observed in Atlantic, Snowden, MS716-15 and AF875-16. In the bruising test, the best varieties were Eramosa, MS700-70, MS401-1 and Onaway, while the worst ones were PGI-3, AF875-16 and AC80545-1 along with Snowden and Somerset.

Variety Characteristics

Eramosa - Very early variety with smooth, round to oblong tubers of good appearance. Yield and specific gravity were low. Chipping quality was low and had few internal defects.

Onaway - Early, high yielding variety. Specific gravity and chipping quality low. Tubers are round to oblong, large and rough. Susceptible to growth cracks and early blight and storability is low.

LaBelle - Late variety. Yield varied considerably between years. Specific gravity was medium. Chipping quality was rather low.

Gemchip - Late, high yielding variety. Tubers are large, round to oblong, good appearance. Specific gravity low. Chips were good and some hollow heart incidence was noted.

Steuben (NY81) - Late, supreme yielder and medium specific gravity. Tubers are very large, round, of good appearance and early set. Few internal defects. Chipping quality good out of the field.

Snowden (W855) - Medium late, high yielding variety. Specific gravity comparable to Atlantic, but higher internal quality and excellent chips. Tends to set many tubers. Rather susceptible to blackspot bruising.

Atlantic - Medium late, chipping variety. High specific gravity. Susceptible to internal defects (hollow heart, vascular discoloration, brown spots), scab, white knot and soft rot.

MS716-15 - Medium-late, chipping variety. Medium-high yielding, high specific gravity, well shaped tubers and medium sized. Excellent chips, no internal defects. Susceptible to common scab.

MS700-70 - Late, high yielder, high specific gravity variety and chips well out of field. Eyes are medium deep, appearance a little rough. Susceptible to common scab.

Saginaw Gold - Mid-season, high yielding variety. Good culinary quality. Chipping quality good, few internal defects, but specific gravity a little lower than in Atlantic. Susceptible to early blight in foliage and tubers.

Somerset - Medium late variety of oblong, well shaped and medium specific gravity tubers. Good chipping quality. Susceptible to greening in the field, scab and growth cracks. Yield varied much between years.

AF875-16 - Medium late variety of high specific gravity, but average yield potential. Good chipping quality, few internal defects.

AC80545-1 - Very late variety of very tall vine. Produced very high yields in 1990, but its yield potential is rather overestimated in 1-row experiments. Medium specific gravity. Tubers large and well shaped. Chips were good.

PGI-3 - High yielding variety of excellent specific gravity. Tubers were rather small in 1990. Hollow heart incidence was recorded, despite small size. Susceptible to scab.

Coastal Chip - Low yield and specific gravity. Many tubers had hollow heart. Susceptible to scab.

MS401-1 - Yellow-flesh variety with outstanding chipping quality, good tuber shape, but tubers are rather small. Specific gravity below that of Atlantic.

LONG VARIETIES

Seven varieties and five breeding lines were tested. They were harvested 112 and 142 days after planting (Tables 3 and 4). Castile was outstanding in yield. High yields were also produced by Calgold, W1005 and A7411-2. Castile has good potential in Michigan for fresh market and processing. A7411-2 showed good potential for processing. The other varieties require further testing. Long type varieties as a rule were very susceptible to blackspot. They all require careful handling. However, ND1538-1 was a good exception. It also had well shaped tubers and high culinary quality. In the boiling test, Russet Norkotah, Frontier Russet and MN10874 showed some darkening after one hour. Directly after boiling, however, all varieties were good to very good in color.

Variety
Characteristics

Castile (B7592-1) - A late maturing variety and a top yielder. Produces oblong to long, very large, white-skin tubers of few internal defects. Specific gravity medium. Susceptible to blackspot.

Calgold - High yielding, russet variety. Large tubers of low specific gravity. Susceptibilities to blackspot and hollow heart were noticed in 1990. Resistant to scab.

W1005 - High yield and specific gravity. Resistant to scab, susceptible to blackspot.

A7411-2 - Late, medium yield, high specific gravity, good tuber appearance and few internal defects. Excellent potential for processing. Susceptible to blackspot.

Russet Nugget - Very late, average yield and very high specific gravity. Susceptible to hollow heart and blackspot.

A78242-5 - Medium late, russet variety. Average yield and specific gravity medium low. Tubers blocky with good appearance. Leaves display mosaic at early stage which is not due to virus infection.

Eide Russet (MN10874) - Yield in 1990 on the level of Russet Burbank. Specific gravity rather low. Few internal defects. Resistant to scab. Susceptible to blackspot.

ND1538-1 - Average yield, good culinary quality. Low specific gravity. Resistant to blackspot. Russet type, good shape and appearance.

Frontier Russet - Medium late variety with average yields. Specific gravity variable in years. Good appearance and cooking quality. Resistant to scab. Hollow heart might be a problem in some years.

Russet Norkotah - Early to mid-season variety. Tubers are oblong to long, well shaped. Yields were rather low, specific gravity low. Resistant to scab. Some after cooking darkening was noticed in some years as well as susceptibility to Verticillium wilt.

Russet Burbank - Used as a check. Late maturity, average yields. Good specific gravity for processing, but produced a high percent of undersized and off-shape tubers. Excellent appearance after boiling. Resistant to scab.

Cal-Ore - Low yield, low specific gravity. No prospect for success in Michigan.

RED VARIETIES

Eight varieties and one breeding line were tested. They were harvested 126 days after planting (Table 5). The group was distinguished in yield, resistance to blackspot and low to very low specific gravity. Viking was the best yielder among all varieties tested in 1990. It had no internal defects and was very resistant to blackspot. Iditared yielded very well, but had much hollow heart. In the boiling test all performed well. After one hour from boiling, ND2224-5 was unacceptably dark.

Variety

Characteristics

Viking - Medium late, excellent yielder. Specific gravity low. Good appearance. Minimal internal defects. Very resistant to blackspot. Large tubers.

Iditared - Medium late, excellent yielder. Specific gravity very low. Much hollow heart in 1990. Large tubers.

Sangre - Medium late, good yielder. Specific gravity very low. Has excellent skin color at harvest. Very slow early establishment and pre-cutting of seed is recommended. Large tubers.

Rose Gold - Mid-season variety. Good yielder. Pink skin, yellow flesh. Specific gravity medium. Few internal defects.

Red Gold - Mid-season, high yielding variety. Pink skin, yellow flesh. Minimal internal defects. Specific gravity low. Has tendency to poor sizing.

ND2224-5 - Medium early, high yielding variety. Specific gravity very low. Resistant to blackspot.

Norland - Used as a check variety. Average yield. Light red skin color at harvest. Specific gravity very low. Minimal internal defects. Short dormancy.

Dark Red Norland - Line selection from Norland. Agronomic characters comparable to Norland, but has more desirable red skin color.

ADAPTATION TRIAL

More advanced lines from other states are compared in this trial for adaptation in Michigan (Table 6). Best of these should enter North Central Trial next year. The most promising lines are: (a) for fresh market - Ell-45, NY84 and NY78. They are high yielding, but their specific gravity is low. (b) for chipping - E55-27, MS401-7, MS401-2 and E55-35. These are characterized by an average to good yield potential, high to very high specific gravity, lack of internal defects and an acceptable to good chipping quality.

Michigan Table 1. Round Whites - First Date-of-Harvest, MSU Montcalm Research Farm, August 13, 1990 (98 Days).

Variety	Yield (cwt/A)		Percent Size Distribution					Spec. Grav.	Agtron Color	Defects		
	U.S. #1	Total	U.S. #1	<2"	2-3 $\frac{1}{4}$ "	>3 $\frac{1}{4}$ "	Pick Outs			HH	VAS	IBS
Onaway	395	444	89	5	63	26	6	1.066	48	0	1	0/37
Steuben	385	404	95	4	75	20	1	1.077	75	6	0	0/40
AC80545-1	369	401	92	6	89	4	2	1.077	79	0	0	0/13
Eramosa	321	345	93	6	80	13	1	1.065	57	4	1	0/32
Superior	311	335	91	8	77	14	1	1.074	76	3	1	0/32
MS401-1	299	365	82	17	79	3	1	1.085	81	4	0	0/9
Gemchip	286	321	89	9	82	7	1	1.070	70	0	0	0/15
MS716-15	280	319	88	12	84	3	1	1.086	72	0	0	0/6
Atlantic	274	316	87	11	75	11	3	1.085	76	11	0	0/25
Coastal Chip	274	311	88	10	77	11	2	1.077	79	7	0	0/26
AF875-16	274	306	89	9	83	6	2	1.090	73	1	0	0/15
Saginaw Gold	264	320	82	16	81	1	2	1.078	75	0	0	0/3
MS700-70	264	309	85	14	81	5	1	1.083	75	1	0	2/11
Snowden	257	328	78	21	77	2	0	1.085	76	0	0	0/4
LaBelle	235	258	91	8	77	14	1	1.075	73	0	0	0/27
Somerset	<u>202</u>	<u>254</u>	<u>80</u>	16	78	1	5	<u>1.076</u>	76	0	0	0/2
AVERAGE	293	333	87					1.078				

*Internal defects/number of oversize (>3 $\frac{1}{4}$ ") tubers cut.

Planted May 7, 1990

Harvested August 13, 1990

Spacing 12" x 34"

Michigan Table 2. Round White - Second Date-of-Harvest, MSU Montcalm Research Farm, September 24, 1990 (140 Days).

Variety	Yield (cwt/A)		Percent Size Distribution					Pick Spec. Grav.	Defects*				Blackspot Rating**	Scab Rating
	U.S. #1	Total	U.S. #1	<2	2-3½	>3½	Outs		Defects*					
									HH	VAS	IBS	SED ^a		
AC80545-1	573	632	90	6	65	25	4	1.076	8	4	0	0/37	M	MS
Steuben	540	568	95	4	63	32	1	1.076	2	3	1	1/40	S	S
Gemchip	480	514	93	5	81	13	1	1.071	10	1	0	1/39	M	MS
Snowden	433	492	88	11	84	4	1	1.082	1	4	2	0/15	M	S
MS716-15	429	485	89	11	84	5	1	1.086	0	1	0	0/20	R	S
Superior	424	453	94	5	83	11	2	1.071	2	1	0	1/33	R	MR
MS700-70	410	457	90	9	77	13	1	1.081	2	4	1	2/36	R	S
Onaway	402	459	87	7	67	21	6	1.063	0	8	0	1/38	R	MS
PGI-3	396	481	82	17	79	3	1	1.104	3	1	0	0/10	HS	S
Saginaw Gold	374	443	84	16	78	5	1	1.074	0	0	2	0/17	R	MS
MS401-1	348	403	86	13	85	2	0	1.079	3	1	0	0/6	R	S
AF875-16	337	364	92	5	85	8	2	1.087	5	2	1	0/21	S	MS
Eramosa	329	369	89	10	84	5	1	1.059	1	2	0	1/12	HR	S
Coastal Chip	316	356	89	9	74	15	2	1.074	14	3	1	1/34	M	S
LaBelle	309	346	89	8	67	22	3	1.069	0	1	0	4/37	M	-
Somerset	295	346	85	13	78	8	2	1.077	5	0	1	0/16	M	S
Atlantic	284	332	85	12	74	12	3	1.081	8	3	1	0/25	M	S
AVERAGE	393	441	89					1.077						

*Internal defects/number of oversize (>3½") tubers cut.

**Observations from 1988-1990; HR - Highly resistant, R - Resistant,
M - Moderately susceptible, S - Susceptible.

^aSED - Stem end discoloration.

Planted May 7, 1990

Harvested September 24, 1990

Spacing 12" x 34"

Michigan Table 3. Long Varieties - First Date-of-Harvest, MSU Montcalm Research Farm, August 27, 1990 (112 Days).

Variety	Yield (cwt/A)		Percent Size Distribution					Spec. Grav.	Defects*		
	U.S. #1	Total	U.S. #1	<4oz	4-10oz	>10oz	Pick Outs		HH	VAS	IBS
B7592-1 (Castile)	418	502	83	14	59	24	3	1.077	0	0	0/38
W1005	378	528	71	27	66	5	2	1.089	0	0	0/19
A7411-2	330	426	78	19	67	11	3	1.087	2	0	0/31
ND1538-1	312	423	73	25	64	9	2	1.071	0	0	0/24
A78242-5	283	339	82	17	58	24	1	1.074	4	0	0/32
Frontier Russet	266	364	72	23	55	17	4	1.075	16	0	0/30
MN10874	265	372	71	28	67	4	1	1.076	0	0	0/13
Russet Norkotah	254	371	67	32	61	6	1	1.072	0	1	1/17
Russet Burbank	236	397	59	37	56	3	4	1.082	3	0	0/10
Russet Nugget	<u>146</u>	<u>237</u>	<u>61</u>	38	57	4	1	<u>1.092</u>	6	0	0/8
AVERAGE	289	396	72					1.080			

*Internal defects/number of oversize (>10 oz) tubers cut.

Planted May 7, 1990

Harvested August 27, 1990

Spacing 12" x 34"

Michigan Table 4. Long Varieties - Second Date-of-Harvest, MSU Montcalm Research Farm, September 26, 1990 (142 Days).

Variety	Yield (cwt/A)		Percent Size Distribution				Pick Spec.	Defects*			Blackspot Rating**	Scab Rating		
	U.S. #1	Total	U.S. #1	<4oz	4-10	>10oz		Outs	Grav.	Defects*				
										HH			VAS	IBS
B7592-1 (Castile)	535	616	69	12	34	34	2	1.078	3	1	1/30	S	R	
Calgold	481	591	82	15	48	34	3	1.069	24	1	0/40	S	HR	
W1005	455	553	87	16	74	13	1	1.085	5	0	0/36	S	HR	
A7411-2	429	493	90	13	56	34	1	1.089	5	1	0/40	S	R	
R. Nugget	357	449	79	18	60	19	3	1.094	25	1	1/40	S	HR	
A78242-5	347	410	85	13	53	31	3	1.070	0	1	1/40	M	MS	
MN10874	341	451	83	24	69	14	1	1.073	0	1	0/37	S	MS	
ND1538-1	313	421	74	23	59	16	3	1.066	0	0	0/35	HR	-	
R. Burbank	308	446	70	27	61	8	4	1.080	9	0	1/27	M	HR	
Frontier R.	289	352	82	16	50	32	2	1.072	17	0	5/40	M	R	
R. Norkotah	268	377	71	28	57	14	1	1.069	2	1	0/32	R	HR	
Calore	<u>143</u>	<u>248</u>	<u>68</u>	42	66	3	0	<u>1.073</u>	5	0	0/15	M	R	
AVERAGE	356	451	78					1.077						

*Internal defects/number of oversize (>10 oz) tubers cut.

**Observations 1988-1990; HR - Highly resistant, R - Resistant,
M - Moderately susceptible, S - Susceptible.

Planted May 7, 1990

Harvested September 26, 1990

Spacing 12" x 34"

Michigan Table 5. Red Varieties Trial, MSU Montcalm Research Farm, September 10, 1990 (126 Days).

Variety	Yield (cwt/A)		Percent Size Distribution				Pick Spec.		Defects*			Blackspot Rating**	Scab Rating
	U.S. #1	Total	U.S. #1	<2"	2-3½"	>3½"			HH	VAS	IBS		
Viking	682	738	92	2	52	41	5	1.069	0	0	0/40	R	MS
Iditared	668	714	94	4	64	30	3	1.063	28	0	0/40	M	MS
Sangre	476	530	90	7	71	18	3	1.067	8	0	1/39	HR	HR
Rose Gold	430	496	87	12	79	7	1	1.074	2	0	1/26	R	MS
Red Gold	369	469	78	20	75	3	2	1.070	0	0	0/12	M	MS
ND2224-5	355	415	86	12	76	9	3	1.056	8	0	0/27	R	R
Norland	354	403	87	10	84	4	3	1.057	0	0	0/14	HR	R
Dk Red Norland	<u>308</u>	<u>371</u>	<u>82</u>	17	82	1	1	<u>1.056</u>	0	0	0/6	HR	R
AVERAGE	455	517	87					1.064					

*Internal defects/number of oversize (>3½") tubers cut.

**Observations 1988-1990; HR - Highly resistant, R - Resistant,
M - Moderately susceptible, S - Susceptible.

Planted May 7, 1990

Harvested September 10, 1990

Spacing 12" x 34"

Michigan Table 6. Adaptation Trial, MSU Montcalm Research Farm, September 17, 1990
(133 Days).

Variety	Yield (cwt/A)		Percent Size Distribution				Pick Outs	Spec. Grav.	Defects*		
	U.S. #1	Total	U.S. #1	<2"	2-3½"	>3½"			HH	VAS	IBS
E11-45	556	600	93	7	88	4	0	1.066	0	0	0/18
NY84	552	601	92	7	76	16	2	1.065	0	0	1/40
B9792-8B	514	635	81	8	73	8	11	1.096	26	1	0/28
F24-12	509	531	96	4	81	15	0	1.070	5	0	0/38
Trent	508	536	95	4	75	20	2	1.099	12	2	0/40
E55-27	479	541	88	11	84	5	0	1.085	1	0	0/28
MS401-7	468	512	91	7	87	4	2	1.091	1	0	0/15
MS401-2	465	482	96	3	69	27	1	1.087	0	0	0/40
FG6-15	464	486	96	4	74	22	0	1.073	5	0	0/40
NY78	446	479	93	7	73	20	0	1.070	3	0	1/40
E55-44	426	454	94	6	84	9	0	1.076	6	0	1/27
E55-35	391	445	88	12	86	2	0	1.089	0	0	0/7
E57-13	364	400	91	9	79	12	0	1.072	1	0	0/31
MS401-4	282	373	75	24	75	0	1	1.079	0	0	0/0
MS402-8	260	270	96	3	58	39	0	1.072	3	0	0/40
B9792-61	252	330	76	23	75	1	1	1.078	0	0	0/13
F143-1	<u>216</u>	<u>294</u>	<u>74</u>	24	64	9	2	<u>1.071</u>	2	0	1/20
AVERAGE	421	469	89					1.079			

*Internal defects/number of oversize (>3½") tubers cut.

Planted May 7, 1990

Harvested September 17, 1990

Spacing 12" x 34"

II. MICHIGAN STATE

UNIVERSITY POTATO BREEDING PROGRAM David S. Douches, R.W. Chase, K. Jastrzebski,
R. Hammerschmidt, J. Cash, and G. Bird

The potato breeding program at MSU can be divided into three integrated directions: 1) breeding and varietal development, 2) germplasm enhancement, and 3) genetic studies. The breeding goals are based upon current and future needs of the Michigan potato industry. Traits of importance include chipping and boiling quality, disease resistance (ie. scab and early die), storability, along with shape, internal quality and appearance.

Varietal Development Each year 25-40 cultivars and advanced seedling lines are chosen for the crossing block to generate new seedling families for variety development. These clones are chosen on the basis of yield, processing ability, specific gravity, disease resistance, adaptation, internal and external quality, etc. We make over 200 cross combinations to complement characteristics of the different clones to develop new varieties.

In 1990, approximately 200 single-hill selections were made from the initial population of 15,000 seedlings at Montcalm. These selections will be advanced to 4-8 hill plots in 1991. Specific gravity ranged from 1.098 to 1.051 with 70 of the selections having values 1.080 or greater. Fifty-five of these selections had not broken dormancy (at 50°F) after 2 1/2 months of storage, while, thirty-nine also had low glucose levels. Chip samples will be made from these selections at the end of the storage season. In addition to these selections, six 12-hill selections were made and will be advanced to 2x20 hill replicated trials in 1991.

Germplasm Enhancement We have also developed a "diploid" breeding program in an effort to simplify the genetic system in potato and exploit more efficient selection of desirable traits. In general, diploid breeding utilizes haploids of cultivated species and diploid wild and cultivated tuber-bearing relatives of the potato. These represent a large source of valuable germplasm, which can broaden the genetic base of the cultivated potato and also provide specific desirable traits such as tuber dry matter content, cold chipping and dormancy, along with resistance to disease, insects, and virus. Even though these potatoes have only half the chromosomes of the varieties in the U.S., we can cross these potatoes to transfer the desirable genes by exploiting 2n pollen. The diploid breeding program at MSU is a synthesis of five species: haploid S. tuberosum

(adaptation, tuber appearance), S. phureja (cold-chipping, specific gravity), S. tarijense and berthaultii (tuber appearance, insect resistance) and S. chaconese (specific gravity, low sugars, dormancy).

From an initial population of 3,000 seedlings from 60 crosses, 183 diploid selections have been made. Selection criteria was based upon tuber appearance, size, dormancy, and internal quality, along with maturity, specific quality, and chip quality.

Sixty-two of these selections have specific gravity greater than 1.080, while 28 also have Agtron chip scores greater than 55. A total of eighty selections will be tested for cold-chipping (40°F) at the end of the storage season.

Advanced Selections In 1990. 30 advanced selections from USDA Idaho, Maine, USDA Beltsville, Wisconsin, New York, Minnesota and North Dakota were grown and evaluated at the Montcalm Potato Research Farm. Each line was planted in two replications (23 hills/replication). Atlantic and Russet Burbank and Superior were used as standards in the trial. The field was planted May 15 and harvested August 27 (104 days). The plots were mechanically harvested then graded for size distribution, internal defects, external defects, specific gravity. Table 1 summarizes the data from all the lines tested. In harvest, most of the round types were chipped. This data are reported in Agtron values (model E-10) in Table 1. Additional tubers of these lines were placed in 45°F and 50°F long-term storage (120 days) for further evaluation.

III. POTATO SCAB RESEARCH

Ray Hammerschmidt, Dave Douches, K. Jastrzebski, Karen Ludlam
and Richard Chase

Scab Trial 1990

In order to assess resistance to common scab, 90 varieties were planted in a replicated trial at East Lansing in 1990. There were three replications with five plants per plot. At planting, scab inoculum was broadcast into the open rows. At harvest, 20 tubers per plot were collected for the detailed estimation of infection.

Five classes were distinguished: 0, 1, 5, 10 and 25 percent of the surface area affected by scab on individual tubers. In addition, the type of scab lesion (e.g. surface, pitted) was recorded.

Various criteria were used for the expression of infection in a five degree scale: A) percentage of healthy tubers; B) percentage of tubers infected up to 1 percent of the surface area; C) up to 5 percent; D) 5 to 10 percent; E) 10 percent or more; F) average coverage; G) average severe coverage; and H) a general rating. Lastly, the scores were corrected by one degree if the type of scab presented was pitted.

The most resistant varieties were: 84S10 (2x), W1005, Norgold Russet, Russet Norkotah, Lemhi Russet, Russet Burbank, Frontier Russet, Early Rose and Sangre. The most susceptible varieties were Atlantic, ND860-2, S465, Coastal Chip, Norwis, B0178-16, AF875-15, A80599-2 and MS700-70. Table 1 summarizes the 1990 results for the 90 varieties tested.

Greenhouse Scab Studies

To determine the genetic basis of scab resistance, we have initiated a series of greenhouse studies. To study the genetics within cultivated varieties, we extracted haploids from the varieties Saginaw Gold, Atlantic, Superior, ND860-2 and Nooksack. The 50 percent reduction in chromosome number now allows us to study the inheritance of scab resistance in a less complicated manner and will help us to identify scab resistance genes. We will begin to screen these haploids for their level of scab resistance during the next year. Secondly, a series of crosses between cultivated varieties were made to study the resistance at the cultivar level and also to determine the most efficient time to screen for scab resistance in the breeding program. During 1990, seedlings from a series of crosses were grown in seedling trays with soil infested with the scab organism. Scab was evaluated at harvest. The tubers from this harvest were further analyzed by planting into pots containing scab infested soil. Scab was again evaluated on the tubers generated on these plants. These tubers are being held for field evaluation in 1991. This sequence of screens will allow us to more precisely determine the level of resistance as well as serve as a check for disease escapes.

In conjunction with the research of Douches and Freyre, we are attempting to "tag" the scab resistance genes in a diploid population using molecular markers. To facilitate this aspect of the research, crosses were made in 1990 between scab resistant and susceptible clones. A summary of the scab reaction in the diploids is shown in Table 2. These crosses are now ready for evaluation in the greenhouse. In order to identify new sources of resistance to scab, 38 plant introductions of Solanum species obtained from the Potato Introduction Station (IR-1) were induced to tuberize. These tubers will be used to grow plants in pots for scab resistance evaluation.

Variety by Strain Evaluation

Observations that varieties, such as Onaway, were exhibiting more scab than previously noted suggested that we may be dealing with more virulent strains of the scab pathogen. In order to test this, a scab strain by variety analysis was carried out. In these tests, six potato varieties were tested against four strains of scab causing Streptomyces isolated in Michigan. The results are shown in Tables 3-5. These results indicate that there is some degree of interaction between the isolate of Streptomyces and the severity of the scab coverage and/or the type of lesion that develops. These results indicate that both the isolate of the scab organism and the genotype of the host plant will influence the type and severity of scab.

Because of the variation in scab reaction, we further investigated the characteristics of one of the isolates that appeared to be more virulent. This isolate was found to be different from the common scab and in a number of characteristics (Table 6). The acid intolerance of this strain suggests that it is not the acid scab pathogen. Thus, it is possible that some of the scab that is now being observed on varieties generally thought to be resistant (e.g. Onaway) may be due to changes in the pathogen.

Biochemical Markers for Resistance

Since the mature periderm provides an effective barrier to scab infection, we examined young periderm samples from scab resistant and susceptible varieties for differences in peroxidase isozymes. This enzyme is needed for the final step in part of suberin formation. Both varieties and diploids could be distinguished, and we are now trying to determine if these differences can be correlated with resistance.

Michigan Table 1. 1990 Scab Trial, Michigan State University.

Variety	Scab ^{1/} Rating	Type ^{2/}	Variety	Scab Rating	Type
191-11	2.9	S	Lemhi Russet	1.5	S
84S10	1.1	S	MN 10874	1.8	S
84SD22	2.3	S	MN 12823	3.5	P
A 74114-4	2.5	S	MN 12828	2.8	S
A 7411-2	2.2	P	MN 13540	3.8	P
A 76147-2	2.2	S	MN 13740	2.8	S
A 78242-5	2.8	P	MN 9632	2.8	S
A 79141-2	3.0	S	MS 401-1	3.3	P
A 80559-2	4.2	P	MS 401-2	3.2	P
AC 80545-1	3.5	S	MS 401-7	2.0	P
AF 845-11	2.0	P	MS 402-7	3.3	S
AF 875-15	4.0	P	MS 402-8	2.2	P
AF 875-16	2.8	P	MS 700-70	4.8	P
AF 875-17	2.1	S	MS 716-15	3.3	P
AF 879-3	2.7	S	ND 2224-5	2.3	P
Atlantic	4.0	P	ND 860-2	3.7	S
B 0172-15	2.2	S	NDA 2031-2	3.7	P
B 0175-21	2.7	P	Norchip	2.3	S
B 0178-16	4.5	P	Norgold Russet	1.5	S
B 0178-34	3.8	P	Norland	2.7	S
B 0179-19	3.5	P	Norwis	4.0	S
B 0202-4	3.7	P	Onaway	3.3	S
B 0234-4	2.8	S	Ontario	2.3	P
B 0257-12	3.7	P	PG 1-3	3.8	P
B 0257-3	3.7	P	Russet Norkotah	1.3	S
B 0405-4	3.5	P	Red Gold	3.2	P
B 7592-1	1.8	R	Red LaSoda	3.2	P
B 9792-2B	2.5	S	Red Pontiac	3.8	P
B 9955-11	2.7	P	Rose Gold	2.8	P
B 9955-33	2.7	P	Russet Burbank	1.7	S
Calgold	1.0	S	Russet Nugget	2.0	S
Calore	2.0	S	S 465	3.7	P
Coastal Chip	4.3	P	Saginaw Gold	2.7	S
D 43	3.2	P	Sangre	1.7	S
Donna	2.8	P	Sebago	3.3	P
E 55-27	3.0	S	Shepody	4.2	P
E 55-35	3.5	P	Snowden	2.5	P
Early Rose	1.8	P	Somerset	3.3	P
Eramosa	3.0	P	Spartan Pearl	3.0	S
FG 6-15	3.2	P	Steuben	2.5	S
Frontier Russet	1.5	S	Superior	2.8	P
Gemchip	2.5	P	Trent	2.5	P
Green Mountain	2.8	S	Viking	2.7	S
Iditared	2.8	P	W 1005	1.3	S
Katahdin	2.5	P	W 231	3.0	P
			White Rose	2.8	P

^{1/} 1 = Highly resistant, 5 = Highly susceptible.

^{2/} S = Surface, P = Pitted.

Michigan Table 2. Scab Reaction of Diploid Parents.

Name	Scab Reaction	Origin
84S10	Resistant	<u>Phureja</u>
84SD22	Resistant	<u>Chacoense</u> x <u>tuberosum</u>
W5295.7	Moderately resistant	<u>Phureja</u> x <u>tuberosum</u>
P100-2	Moderately susceptible	<u>tuberosum</u> x <u>tarijense</u>
W5337.3	Susceptible	<u>Phureja</u> x <u>tuberosum</u>
DM56-4	Susceptible	<u>Phureja</u> x <u>tuberosum</u>

Michigan Table 3. Variety x Strain - Percent Surface Coverage.

Strain	Superior	Ontario	Atlantic	Onaway	Spartan Pearl	ND860-2
F945	R	R	MS	S	S	S
DPZ	MS	R	MS	MS	MS	S
ONA	R	R	R	MS	MS	R
RP	R	R	MS	MS	S	MS

R = 0-5% Coverage; MS = 5-25% Coverage; S = >25% Coverage.

Michigan Table 4. Variety x Strain - Type of Lesion.

Strain	Superior	Ontario	Atlantic	Onaway	Spartan Pearl	ND860-2
F945	R	R	MS	MS	S	S
DPZ	R	R	MS	MS	MS	S
ONA	R	R	R	R	MS	R
RP	R	R	MS	R	R	MS

R = No scab or surface; MS = Slightly pitted; S = Deep pitted.

Michigan Table 5. Variety x Strain - Percent Surface x Type of Lesion.

Strain	Superior	Ontario	Atlantic	Onaway	Spartan Pearl	ND860-2
F945	R	MR	MS	S	S	S
DPZ	MR	R	MS	MS	S	S
ONA	R	R	R	MR	MS	MR
RP	R	R	MS	MR	S	S

R = <1% Coverage surface scab;

MR = <1% Deep pitted or 1-5% surface type;

MS = 1-5% Pitted or 5-25% shallow pits or surface;

S = >5% Pitted or >25% shallow pits or surface.

Michigan Table 6. Characteristics of DP Strain of Streptomyces.

Characteristic	DP	S. scabies
Spore chains	Straight	Spiral
Spore color	Light gray	Gray
Reverse color	Tan	Golden-brown
Melanin pigments	No	Yes
Pitting on Burbank	Yes	No
Acid tolerant	No	No
Salt tolerant	70 g/l	40 g/l
Sugar use	All used	All used
	(good growth)	(poor-good growth)
Growth on pectins	fair to poor	fair to good

NEW JERSEY

Melvin R. Henninger

INTRODUCTION

All trials were conducted at the Rutgers Research & Development Center near Bridgeton, NJ in Upper Deerfield Township. All plots were 21' long and 3' wide with four replications and planted by hand on April 10. Seedpieces were spaced at 9" for round types and 12" for long types. Dyfonate 20G and 500 lbs./A of 10-10-10 were broadcast and disk-in before planting. Wireworms were not a problem in 1990. Prowl and Sencor were applied 10 days after planting followed by Dual a week later. Additional 100 lbs./A nitrogen was topdressed 5 weeks after planting.

Colorado Potato beetles were troublesome all season. All plots were sprayed eight times with six different materials and control was o.k. not good. Other insects and diseases were not a problem and did not limit growth. Rainfall was well distributed with 19.3" plus irrigation of 1.8" from planting to late harvest. Vine growth was good, except for a two week period at the beginning of July when temperatures were high. This period hurt the Superior yields in my opinion.

All plots were harvested with a single-row mount commercial harvester modified for bagging. No attempt was made to recover any lost tubers caused by normal harvester operation. All plots were sized with a spool sizer and specific gravities were determined by weight in air and water. Chip color was done by Mr. Steve Molnar of Wise Foods.

To simplify above information, trade names of some products are used. No endorsement is intended, or is criticism implied of similar products not named.

New Jersey Table 1. Yields, Specific Gravities, and Tuber Sizes for 17 Early Harvested Potato Varieties
Grown on a Sandy Loam Soil at the Rutgers Res. & Dev. Center - Bridgeton, NJ 1990 (1).

Variety Name	Seed Source (2)	Total Market Yield		Spec. Grav.	% O v e r			% Culls		% Tuber Sizes (3)		
		Yield cwt/a	% of Sup.		1	7/8	2 1/2	1	2	1	2	3
Atlantic	ne	276	255	1.086	93	29	0	7	64	27	1	0
Coastal Chip	us	266	206	1.073	81	23	2	19	58	23	1	0
Norland	ne	243	208	1.063	85	12	0	15	73	8	5	0
Reddale	ne	323	313	1.059	97	63	0	3	34	43	20	0
Red Gold	ne	304	258	1.074	85	16	0	15	69	15	2	0
Red Pontiac	ct	345	320	1.055	93	42	0	7	51	35	7	0
Redsen	ct	220	172	1.059	77	15	0	23	62	13	1	0
Sangre	ne	307	255	1.061	84	17	1	16	67	17	1	0
Somerset	ne	299	259	1.073	86	9	0	14	77	9	0	0
Steuben	ne	314	286	1.072	91	39	0	9	52	35	4	0
Sunrise	ct	291	243	1.071	89	27	5	11	62	24	3	0
Superior	ne	244	217	1.073	90	22	2	10	68	21	1	0
Yukon Gold	ne	221	199	1.075	89	28	0	11	61	26	2	0
B0174-19	us	235	213	1.079	90	25	0	10	66	23	1	0
B0257- 3	us	169	147	1.072	87	26	0	13	61	23	3	0
B0257- 9	us	165	152	1.072	92	38	0	8	54	32	6	0
B0257-12	us	223	206	1.071	92	29	0	8	63	28	1	0
Grand Mean		261	230	1.070	88	27	1	12	61	24	4	0
CV		17	20	.004	7	36						
Bayes LSD .05		64	64	.003	12	13	3	12	11	11	6	ns

(1) All plots harvested on July 11.

(2) ct = Certified Seed, ne = Sangerville Seed Farm, us = USDA Chapman Farm.

(3) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4.

New Jersey Table 2. Yields, Specific Gravities, and Tuber Sizes for 7 Russet Potato Varieties Grown on a Sandy Loam Soil at the Rutgers Research & Dev. Center - Bridgeton, NJ 1990 (1).

Variety Name	Seed Source (2)	Total Yield cwt/a	Market Yield % of BelRus	Spec. Grav.	% O v e r		% Culls	% Tuber		Sizes (3)				
					4 oz	8 oz		1	2	3	4	5		
BelRus	us	153	108	1.081	71	5	0	29	66	4	1	0		
Hilite Russet	ne	244	191	1.069	79	3	0	21	76	3	0	0		
Nemarus	us	164	128	1.066	78	21	0	22	57	20	1	0		
Norking Russet	ct	202	144	1.075	62	6	0	38	57	6	0	0		
Frontier Russet	ne	240	192	1.069	79	9	0	21	70	9	0	0		
Norkotah Russet	ct	187	133	1.070	72	10	21	28	62	10	0	0		
B0220-14	us	140	105	1.073	73	6	0	27	68	6	0	0		
Grand Mean		190	143	1.072	73	8	3	27	65	8	0	0		
CV		30	39	.004										
Bayes LSD .05		ns	ns	.003	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

(1) All plots were harvested early on July 11.

(2) ct = Certified Seed, ne = Sangerville Farm and us = USDA Chapman Farm.

(3) Size 1 = Under 4 oz, S2 = 4 to 8 oz, S3 = 8 to 12 oz, S4 = 12 to 16 oz, and S5 = Over 16 oz.

New Jersey Table 3. Plant and Tuber Characters, Tuber Defects, Chip Color and Overall Rating for
24 Potato Varieties Grown in Bridgeton, NJ - 1990 (1).

Variety	P L A N T					&	TUBER CHARACTERS					T U B E R D E F E C T S										OVER		
	T S A A M						C T S D A U E					S G S H G S H					H N R					CC	ALL	
	y	z	p	p	t		l	x	h	p	p	n	y	G	C	S	S	R	B	H	N	R		
Atlantic	6	7	7	7	7		7	7	2	8	8	7	7	9	9	2		9	9	9	4	9	3	7
Coastal Chip	5	6	6	7	5		8	8	2	8	7	6	3	9	9	3		9	9	9		9	5	6
Norland	3	4	3	2	2		2	7	3	5	8	7	7	9	8	6		9	9	9		9	5	7
Reddale	4	6	5	7	6		2	8	3	5	7	7	7	9	7	2		9	9	9		9	6	8
Red Gold	3	6	6	6	5		2	7	2	7	6	7	5	9	7	5		9	9	9		9	5	6
Red Pontiac	6	7	8	7	8		2	7	3	7	4	5	2	6	9	2		5	9	9		9	7	4
Redsen	5	4	5	5	3		2	8	2	7	7	7	7	9	9	3		9	9	9		9	7	6
Sangre	7	7	8	8	8		2	6	2	7	8	7	8	9	8	1		9	9	9		9	8	7
Somerset	5	5	6	8	6		8	8	6	8	8	8	8	9	7	1		9	9	9		9	3	8
Steuben	7	8	9	8	9		8	8	2	8	8	8	7	9	9	2		9	9	9		9	5	8
Sunrise	3	6	6	7	4		8	8	3	8	7	7	8	7	6	1		9	9	9		9	5	8
Superior	5	6	6	7	5		7	7	3	7	8	7	7	9	9	8		9	9	9		9	5	8
Yukon Gold	8	8	6	5	4		8	9	3	7	7	7	8	9	9	1		9	9	9		9	5	7
B0174-19	8	7	5	6	8		9	8	2	8	8	8	8	9	9	1		9	9	9	11	9	6	7
B0257- 3	6	5	5	7	5		8	8	2	8	6	7	8	9	9	3		9	9	9		9	7	5
B0257- 9	6	4	5	7	8		7	7	2	7	7	6	8	9	9	2		9	9	9		9	7	5
B0257-12	4	5	6	7	7		8	7	3	7	7	7	8	9	9	5		9	9	9		9	6	6
Belrus	4	4	5	7	7		4	2	8	6	8	7	8	7	9	6		9	9	9		9	4	7
Hilite Russet	5	5	7	8	9		6	7	8	5	5	6	8	9	9	1		9	9	9		9	6	6
Nemarus	6	4	5	7	5		5	3	8	7	6	6	8	9	9	5		9	9	9		9	5	6
Norking Russet	5	6	7	8	8		4	2	7	5	7	6	8	9	9	2						9	4	7
Frontier Russet	4	5	7	8	8		5	4	6	6	6	7	8	9	9	2		9	9	9		9	6	6
Russet Norkotah	5	6	6	7	7		5	3	8	7	6	7	8	9	9	4		9	9	9		9	5	8
B0220-14	5	4	4	6	5		5	3	7	7	7	7	8	9	9	3		9	8	9		9	4	6

New Jersey Table 3. (Continued).

Plant Characters		Tuber Characters		Tubers Defects		Defect Rating		Ty = Plant Type	
Ty = Type		Cl = Color		SG = Second Growth		1 = Dead		1 = V. decumbent	
Sz = Size		Tx = Texture		GC = Growth Crack		2 = Very Severe		2 =	
Ap = Appearance		Sh = Shape		SS = Skin Set		3 = Severe		3 = decumbent	
AP = Air Pollution		Dp = Depth		HS = Heat Sprouts		4 =		4 =	
Mt = Vine Maturity		Ap = Appearance		GR = Green Tubers		5 = Moderate		5 = Spreading	
		Un = Uniformity		SB = Scab		6 =		6 =	
		Ey = Eye Depth		HH = No. of Hollow Heart		7 = Slight		7 = Upright	
				HN = No. of Heat Necrosis		8 = Very Slight		8 =	
				R = Heat Nec. Rating		9 = No Symptoms		9 = Very Upright	

Plant / Tuber		Plant / Tuber		Plant / Tuber		Plant / Tuber		Plant / Tuber	
Sz=Plant Size		AP=Appearance		AP=Air Pollution		Mt=Vine Maturity		Cl=Tuber Color	
1 = V. Small		1 = Very poor		1 = Dead		1 = Very Early		1 = Purple	
2 =		2 =		2 =		2 = Early		2 = Red	
3 = Small		3 = Poor		3 = Mod. Defol		3 =		3 = Pink	
4 =		4 =		4 =		4 = Med Early		4 = Dark Brown	
5 = Medium		5 = Fair		5 = Mod Injury		5 = Medium		5 = Brown	
6 =		6 =		6 =		6 = Med Late		6 = Tan	
7 = Large		7 = Good		7 = Mild Injury		7 =		7 = Buff	
8 =		8 =		8 =		8 = Late		8 = White	
9 = V. Large		9 = Excellent		9 = No Symptoms		9 = Very Late		9 = Bright White	

Sh=Tuber Shape		Dp=Tuber Depth		Un=Tuber Uniformity		Ey=Eye Depth		CC=Chip Color		Overall	
1 = V. Round		1 = V. Flat		1 = V. Variable		1 = V. Deep		1 = Paper white		1 = Discards	
2 = Round		2 =		2 =		2 =		2 =		2 =	
3 = Round-oblong		3 = Flat		3 = Variable		3 = Deep		3 =		3 =	
4 = Mostly Oblong		4 =		4 = Unacceptable		4 =		4 = Acceptable		4 =	
5 = Oblong		5 = Acceptable		5 =		5 = Medium		5 = Borderline		5 = Some Merit	
6 = Mostly Oblong		6 =		6 = Acceptable		6 =		6 = Unacceptable		6 = Try Again	
7 = Mostly Long		7 = Good		7 =		7 = Shallow		7 =		7 = Good	
8 = Long		8 =		8 =		8 =		8 =		8 = Excellent	
9 = Cylindrical		9 = V. Round		9 = V. Uniform		9 = V. Shal.		9 = Black chip		9 = Name It	

New Jersey Table 4. Yields, Specific Gravities, and Tuber Sizes for 21 Round Potato Selections Grown on a Sandy Loam Soil at the Rutgers Research & Dev. Center - Bridgeton, NJ 1990 (1).

Variety Name	Seed Source (2)	Total Yield cwt/a	Market Yield		Spec. Grav.	% O v e r			% Culls	% Tuber S i z e s (3)					
			% of Sup.	cwt/a		1	7/8	2		1/2	1	2	3	4	5
Allegany	ne	442	415	137	1.074	93	39	0	7	54	33	6	0		
Atlantic	ne	332	304	100	1.082	92	40	1	8	52	32	8	0		
Coastal Chip	ne	341	309	102	1.072	90	42	0	10	49	35	6	0		
Katahdin	ne	415	386	127	1.064	94	47	1	6	47	37	10	0		
Kennebec	ne	428	354	117	1.070	91	36	8	9	55	29	7	0		
La Belle	ne	384	348	115	1.072	92	46	2	8	46	36	10	0		
Norchip	ne	318	273	90	1.070	87	19	2	13	68	19	0	0		
Somerset	ne	430	394	130	1.076	93	36	2	7	57	33	3	0		
Steuben	ne	464	435	144	1.073	95	62	1	5	33	43	19	0		
Superior	ne	338	302	100	1.068	92	29	4	8	63	27	2	0		
AF 828- 5	ne	388	358	118	1.069	92	31	1	8	61	25	6	0		
AF 875-15	ne	375	346	114	1.073	93	39	1	7	54	32	7	0		
AF 875-16	ne	300	271	89	1.080	91	24	0	9	67	20	4	0		
B9792- 8B	ne	465	421	139	1.083	92	25	2	8	67	23	2	0		
B0178-34	ne	433	384	127	1.084	93	47	4	7	46	40	7	0		
B0241- 8	ne	304	270	89	1.075	89	28	1	11	61	25	3	0		
B0256- 1	ne	332	308	101	1.082	94	35	1	6	59	33	2	0		
E55-27	ne	285	236	78	1.075	84	23	1	16	62	20	2	0		
E55-44	ne	332	301	99	1.075	92	27	2	8	65	24	3	0		
E57-13	ne	310	262	86	1.074	84	23	1	16	61	20	3	0		
NY-84	ne	410	365	120	1.059	91	43	2	9	48	33	9	1		
Grand Mean		373	335	110	1.074	91	35	2	9	56	30	6	0		
CV		15	17		.004										
Bayes LSD .05		81	82		.003	3	10	3	3	10	10	5	ns		

(1) All plots were harvested on August 13.

(2) ne = Sangerville Seed Farm.

(3) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4.

New Jersey Table 5. Plant and Tuber Characters, Tuber Defects, Chip Color and Overall Rating for
21 Potato Varieties Grown in Bridgeton, NJ - 1990 (1).

Variety	P L A N T					&		TUBER CHARACTERS					T U B E R										D E F E C T S			OVER ALL
	T	S	A	A	M	C	T	S	D	A	U	E	S	G	S	H	G	S	H	G	S	H	N	R	CC	
	y	z	p	p	t	l	x	h	p	p	n	y	G	C	S	S	R	B	H	H	N	R	CC	ALL		
Allegany	8	8	9	7	8	8	7	2	6	8	8	8	9	9	6	9	9	9	5	1	8	233	7			
Atlantic	5	6	6	5	5	7	6	2	8	7	8	8	7	9	7	9	9	9	1	30	5	234	8			
Coastal Chip	5	4	5	4	4	8	7	2	8	6	6	5	8	7	7	9	9	9		17	7	233	5			
Katahdin	6	6	6	7	7	8	8	2	5	7	8	8	8	8	5	9	9	9	2	7	7	367	8			
Kennebec	7	7	7	7	7	8	9	5	5	7	6	8	7	6	5	7	7	9	2	6	8	458	5			
La Belle	4	5	6	6	7	8	8	6	5	7	6	8	7	9	5	7	9	9	3	14	7	466	5			
Norchip	6	5	7	5	5	8	7	2	7	5	5	5	6	7	7	9	9	9		11	7	334	5			
Somerset	5	5	6	5	5	8	8	6	6	7	6	7	9	9	5	9	7	7	5	9		334	8			
Steuben	7	6	7	7	9	7	6	2	8	8	8	8	9	7	5	7	9	9	1	1	8	246	9			
Superior	5	6	6	5	3	7	6	3	7	7	6	4	7	9	9	9	9	9	1	4	8	366	7			
AF 828- 5	5	6	6	5	4	8	7	6	6	7	6	8	9	8	5	9	8	9	4	9		556	7			
AF 875-15	5	7	5	3	6	8	8	3	5	7	6	7	7	9	7	9	9	9	1	2	8	335	8			
AF 875-16	5	4	5	5	6	8	7	3	6	6	7	8	9	9	8	9	9	9	3	1	8	344	6			
B9792- 8B	5	8	8	8	9	8	7	6	5	6	4	8	7	7	3	9	9	9	6	1	8	35-	5			
B0178-34	4	4	7	6	6	8	8	3	5	6	5	7	7	8	3	9	7	9	2	5	8	444	7			
B0241- 8	4	5	4	3	5	8	8	2	8	7	8	8	9	9	8	9	7	9	3	2	7	223	7			
B0256- 1	5	6	6	3	5	7	5	3	4	5	7	7	7	9	8	7	9	9	5	9		358	6			
E55-27	3	4	6	5	4	7	6	2	7	7	8	8	9	9	8	9	9	9		1	8	123	6			
E55-44	5	6	6	6	6	8	7	3	7	7	6	7	7	8	8	9	9	7		9		322	8			
E57-13	5	5	6	2	2	7	8	3	6	7	6	7	9	9	7	9	7	9	2	9		223	7			
NY-84	3	6	6	4	6	7	7	4	5	6	7	8	9	8	5	7	9	9	1	3	8	468	5			

(1) See New Jersey Table 3 for all Plant and Tuber Characteristics.

New Jersey Table 6.

Yields, Specific Gravities, and Tuber Sizes for 14 Specialty Potato Selections Grown on a Sandy Loam Soil at the Rutgers Research & Dev. Center - Bridgeton, NJ 1990 (1).

Variety Name	Seed Source (2)	Total Yield cwt/a	Market Yield		Spec. Grav.	% O v e r			% Culls	% Tuber Sizes (3)					
			cwt/a	% of Sup.		1	7/8	2		1/2	1	2	3	4	5
Chieftain	ne	427	389	154	1.059	93	33	2	7	60	30	3	0		
Norland	ne	247	222	88	1.061	89	21	0	11	68	21	0	0		
Norland	pf	277	258	102	1.058	92	39	0	8	53	35	4	0		
Reddale	ne	365	356	141	1.060	98	71	0	2	27	45	23	3		
Red Gold	ne	273	227	90	1.071	83	15	0	17	68	15	0	0		
Red Pontiac	ct	440	371	147	1.053	93	46	9	7	47	37	9	0		
Redsen	ct	244	211	84	1.061	85	19	0	15	67	19	0	0		
Saginaw Gold	ne	327	289	115	1.073	88	19	0	12	69	18	1	0		
Sangre	ne	361	303	120	1.059	83	24	1	17	59	21	3	0		
Superior	ne	271	251	100	1.071	92	27	0	8	65	27	0	0		
Yukon Gold	ne	229	206	82	1.074	90	32	0	10	58	29	3	0		
B0615- 2	us	287	250	99	1.064	88	24	1	12	64	22	2	0		
F82026	ne	394	341	135	1.078	86	19	0	14	67	18	1	0		
MN-13420	mn	296	238	94	1.064	81	9	1	19	72	8	1	0		
Grand Mean		317	279	111	1.065	89	28	1	11	60	25	4	0		
CV		16	19		.004										
Bayes LSD .05		68	75		.003	4	11	3	4	10	12	4	ns		

(1) All plots were harvested on August 8.

(2) ct= Certified Seed, ne= Sangerville Farm, us= USDA Chapman Farm, mn= Univ. of Minn., pf= Porter Farm.

(3) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4.

New Jersey Table 7. Plant and Tuber Characters, Tuber Defects, Chip Color and Overall Rating for
15 Specialty Potato Varieties Grown in Bridgeton, NJ - 1990 (1).

Variety	P L A N T					&		TUBER CHARACTERS					T U B E R										D E F E C T S					OVER	
	T	S	A	A	M	C	T	S	D	A	U	E	S	G	S	H	G	S	H	G	S	H	N	R	C	C	ALL		
	y	z	p	p	t	l	x	h	p	p	n	y	G	C	S	S	R	B	H	H	N	R	C	C	ALL				
Chieftain	7	7	7	8	8	2	8	3	7	6	7	5	5	8	4	5	9	9			7	7				6			
Norland (ne)	3	4	3	2	2	2	8	4	6	6	6	6	9	8	8	9	9	9					9			6			
Norland (pf)	4	4	5	4	3	2	8	3	7	7	8	8	6	8	8	7	9	9					9			7			
Reddale	5	4	5	6	7	2	6	3	4	6	6	7	8	9	7	9	9	9	6		1	8				8			
Red Gold	4	6	5	5	3	2	7	2	7	7	6	6	9	9	6	9	9	9			1	8				3			
Red Pontiac	5	7	7	7	8	2	7	3	7	4	5	3	2	9	2	5	9	9					9			2			
Redsen	6	6	5	5	3	2	7	2	8	8	8	8	9	9	7	9	9	9					9			6			
Saginaw Gold	2	5	6	7	6	8	7	2	5	7	6	6	9	9	5	9	9	9			1	8				7			
Sangre	7	6	7	8	7	2	7	3	6	6	7	6	7	6	5	9	9	9			5	7				5			
Superior	5	6	6	7	5	7	6	3	7	6	6	5	7	9	9	9	9	9					9			6			
Yukon Gold	8	8	6	6	3	8	8	2	6	6	7	8	9	9	8	9	9	9			2	8				7			
B0615- 2	6	4	5	7	7	2	6	3	6	7	6	7	8	7	6	9	9	9	1							5			
F82026	4	6	7	8	8	8	6	6	5	5	3	7	9	9	7	9	9	9					9			6			
MN-13420	5	5	4	5	7	1	9	7	5	6	6	7	9	7	6	9	9	9					9			7			

(1) See New Jersey Table 3 for all Plant and Tuber Characteristics.

New Jersey Table 8. Yields, Specific Gravities, and Tuber Sizes for 37 Round White Potato Varieties Grown on a Sandy Loam Soil at the Rutgers Research & Dev. Center - Bridgeton, NJ 1990 (1).

Variety Name	Seed Source (2)	Total Yield cwt/a	Market Yield		Spec. Grav.	% O v e r			% Culls	% Tuber Sizes (3)				
			cwt/a	% of Sup.		1	7/8	2 1/2		1	2	3	4	5
Atlantic	ne	312	295	127	1.081	95	44	0	5	51	39	5	0	
Carola	pf	324	277	119	1.068	85	16	0	15	69	13	3	0	
Delta Gold	pf	280	251	108	1.070	90	25	0	10	65	23	2	0	
Norwis	pf	317	305	131	1.065	96	49	0	4	47	36	13	0	
Sunrise	ct	288	262	112	1.065	93	43	3	7	50	36	7	0	
Superior	ne	260	232	100	1.068	90	27	1	10	63	23	4	0	
AC80545-1	nb	408	393	169	1.067	98	57	1	2	41	44	13	0	
B0174-16	us	256	244	105	1.083	95	51	0	5	45	40	10	0	
B0175-20	us	255	213	91	1.082	85	37	3	15	48	32	5	0	
B0178-30	us	352	333	143	1.077	95	53	0	5	41	43	11	0	
B0209- 1	us	258	251	108	1.070	97	70	0	3	27	52	18	0	
B0257- 3	us	256	233	100	1.083	91	39	0	9	52	33	6	0	
B0257-12	us	244	224	96	1.074	91	29	0	9	62	26	3	0	
B0554- 1	us	286	261	112	1.069	93	54	2	7	39	41	12	1	
B0610- 6	us	340	328	141	1.075	97	70	0	3	26	45	26	0	
Grand Mean		272	244	105	1.072	91	39	2	9	52	32	7	0	
CV		19	22		.007									
W-D Bayes LSD .05		72	72		.007	7	14	5	7	13	11	9	ns	

(1) All plots were harvested on August 13.

(2) ct = Certified, ne = Sangerville, us = USDA Chapman, ny = Cornell Univ., pf = Porter Farm, nb = Neb.

(3) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4

New Jersey Table 9. Plant and Tuber Characters, Tuber Defects, Chip Color and Overall Rating for
37 Potato Varieties Grown in Bridgeton, NJ - 1990 (1).

Variety	P L A N T					&	TUBER CHARACTERS					T U B E R D E F E C T S										OVER	
	T S A A M						C T S D A U E					S G S H G S H					H N R					CC	ALL
	y	z	p	p	t		l	x	h	p	n	y	G	C	S	S	R	B	H	N	R		
Atlantic	6	7	7	5	6	7	6	2	8	8	8	8	9	9	7	9	9	9	27	6	536	8	
Carola	5	7	6	6	6	8	8	5	5	5	3	4	8	9	8	9	9	9	2	7		4	
Delta Gold	8	8	7	7	9	8	8	3	3	4	5	7	9	9	2	9	9	9	5	7		6	
Norwis	5	6	6	4	5	8	8	3	5	6	6	7	9	9	5	9	9	9	5	10	8	333	7
Sunrise	5	6	6	5	3	7	6	3	5	7	7	7	8	6	7	9	9	9	1	8	444	7	
Superior	5	6	6	6	3	7	6	3	5	6	7	4	8	9	9	9	8	9	1	7	455	6	
AC80545-1	7	8	7	6	9	7	6	4	5	7	6	8	8	8	3	9	8	9	11	6	444	8	
B0174-16	7	4	6	6	6	7	7	2	8	8	8	7	8	9	5	8	9	5	1	8	368	7	
B0175-20	6	6	6	5	7	8	8	4	5	4	5	8	8	8	4	9	9	9	9	3	8	357	6
B0178-30	5	6	6	5	6	8	7	2	5	7	6	8	6	9	4	7	8	9	1	6	7	446	7
B0209- 1	5	5	4	6	6	8	7	2	8	8	7	7	9	9	6	9	9	9	9		345	6	
B0257- 3	5	4	5	5	4	8	7	2	7	8	7	7	9	9	5	9	9	9	1	8	345	6	
B0257-12	4	4	5	3	3	8	7	3	8	8	8	8	8	9	8	9	9	8	4	8	455	7	
B0554- 1	5	4	5	6	4	7	7	2	6	7	6	5	7	9	8	7	9	9	9	9	578	7	
B0610- 6	6	6	6	5	5	7	6	2	8	9	8	7	9	9	7	9	9	9	2	6	7	668	8

(1) See New Jersey Table 3 for all Plant and Tuber Characteristics.

New Jersey Table 10. Yields, Specific Gravities, and Tuber Sizes for 17 Russet Potato Selections Grown on a Sandy Loam Soil at the Rutgers Research & Dev. Center - Bridgeton, NJ 1990 (1).

Variety Name	Seed Source (2)	Total Yield cwt/a	Market Yield		Spec. Grav.	% Over		% Culls	% Tuber Sizes (3)		
			cwt/a	% of BelRus		4 oz	8 oz		1	2	3 4 5
BelRus	ne	136	58	100	1.080	42	4	3	58	38	4 0 0
Coastal Russet	ne	179	82	141	1.062	47	2	3	53	45	2 0 0
Frontier Russet	ne	205	86	148	1.073	43	4	0	58	38	4 0 0
Hilite Russet	ne	207	75	129	1.067	37	2	2	63	35	2 0 0
Nemarus	us	118	62	106	1.060	52	1	1	48	51	1 0 0
Norking Russet	ct	203	96	165	1.078	47	0	0	53	47	0 0 0
Russet Norkotah	ne	199	89	153	1.074	42	5	2	58	37	5 0 0
Russet Burbank	ne	236	36	62	1.075	50	6	35	50	44	6 0 0
Superior	ne	240	104	179	1.073	44	2	1	56	42	2 0 0
B9922-11	us	110	54	93	1.069	55	1	5	45	54	1 0 0
B0220-14	us	159	98	168	1.073	63	11	2	37	52	9 1 1
B0338- 2	us	125	50	86	1.069	36	1	0	64	35	1 0 0
B0468-20	us	160	84	144	1.069	52	2	0	48	50	2 0 0
B0455-27	us	180	67	115	1.067	54	6	17	46	48	6 0 0
B0493- 8	us	221	182	313	1.072	83	34	1	17	49	25 9 0
B0502-17	us	126	84	144	1.070	73	23	6	27	50	14 9 0
ND671-4	ne	182	78	134	1.061	44	1	1	56	43	1 0 0
Grand Mean		176	82	141	1.070	51	6	5	49	45	5 1 0
CV		16	34		.004						
Bayes LSD .05		37	39		.004	17	6	6	17	ns	4 5 ns

(1) All plots were harvested on August 7.

(2) ct = Certified Seed, ne = Sangerville Farm, us = USDA Chapman Farm.

(3) Size 1 = Under 4 oz, S2 = 4 to 8 oz, S3 = 8 to 12 oz, S4 = 12 to 16 oz, and S5 = Over 16 oz.

New Jersey Table 11. Plant and Tuber Characters, Tuber Defects, Chip Color and Overall Rating for
17 Russet Potato Varieties Grown in Bridgeton, NJ - 1990 (1).

Variety	P L A N T					&		TUBER CHARACTERS							T U B E R										O V E R		
	T S		A A		M	C	T S D			A U E				S	H G S			H G S			H	N R	C C	A L L			
	y	z	p	p	t		l	x	h	p	p	n	y		G	C	S	S	R	B					H		
BelRus	7	4	3	4	3	4	2	8	5	8	8	8	7	9	8	9	9	9	9	1	7		7				
Coastal Russet	5	4	4	4	3	6	6	8	7	5	4	7	7	7	8	9	9	9	9	4	7		6				
Frontier Russet	7	6	7	5	5	7	7	6	7	7	7	5	9	9	6	9	9	9	9	9		6					
Hilite Russet	6	5	7	6	7	7	7	8	8	6	5	6	9	8	6	9	9	9	9	9		6					
Nemarus	7	3	3	1	3	5	3	7	7	6	5	9	9	9	8	9	9	9	9	9		5					
Norking Russet	5	6	6	6	3	6	6	8	5	6	6	8	9	9	7	9	9	9	9	9		6					
Russet Norkotah	7	6	6	5	2	5	3	7	7	8	8	7	9	9	8	9	9	9	9	9		8					
Russet Burbank	7	7	7	7	6	5	5	9	7	4	2	7	1	8	5	7	9	9	9	1	9		1				
Superior	6	6	6	2	4	6	6	3	7	5	4	4	7	7	9	9	9	9	9		9		6				
B9922-11	6	6	5	6	4	6	6	8	6	6	7	8	9	9	6	9	9	9	9	1	7		6				
B0220-14	6	3	3	6	3	5	3	8	6	7	6	8	9	7	8	9	9	9	9	1	7		6				
B0338- 2	6	5	5	1	2	5	4	8	5	7	6	8	9	9	7	9	9	9	9	9		7					
B0455-27	6	4	5	6	5	5	2	8	7	6	7	9	9	5	8	9	9	9	9	9		1					
B0468-20	5	5	4	1	3	7	7	8	6	6	7	6	9	9	6	9	9	9	9	9		7					
B0493- 8	7	6	5	6	6	6	6	8	5	7	7	8	9	9	6	9	9	9	6	9		8					
B0502-17	7	6	5	5	5	5	4	9	8	6	7	8	7	7	4	9	9	9	9	9		7					
ND671-4	6	6	6	3	2	5	2	8	5	6	7	7	9	9	9	9	9	9	9	9		3					

(1) See New Jersey Table 3 for all Plant and Tuber Characteristics.

New Jersey Table 12. Yields, Specific Gravities, and Tuber Sizes for 15 Round Potato Varieties Grown on a Sandy Loam Soil at the Rutgers Research & Dev. Center - Bridgeton, NJ 1990 (1)

White & Red Variety Name	Seed Source (2)	Total Yield cwt/a	Market Yield % of Std.	Spec. Grav.	% O v e r			% Culls			% Tuber Sizes (3)		
					1	7/8	2 1/2	Culls	1	2	3	4	5
LA12-59	nb	260	127	1.066	89	26		2	11	63	22	4	0
MN-12966	mn	221	107	1.065	87	17		0	13	70	16	1	0
MN-13540	mn	233	91	1.060	72	2		0	28	69	2	0	0
MN-13740	mn	220	88	1.067	69	13		4	31	56	13	0	0
MS401-1	ms	180	80	1.074	81	9		0	19	72	9	0	0
MS402-8	ms	121	60	1.068	92	39		1	8	53	37	2	0
ND1196-2 Red	nd	186	76	1.058	77	9		2	23	68	9	0	0
ND2008-2	nd	244	120	1.061	89	27		0	11	62	27	0	0
W-856	wi	239	96	1.068	82	20		5	18	62	20	0	0
W-870	wi	308	157	1.082	92	25		0	8	68	23	2	0
W-877	wi	174	81	1.082	83	22		0	17	61	22	0	0
Norchip	nd	168	65	1.071	70	2		2	30	67	2	0	0
Red Norland	nd	200	93	1.058	84	12		0	16	72	11	1	0
Red Pontiac	nd	310	141	1.049	92	53		10	8	38	44	9	0
Superior (Std.) ne	ne	217	100	1.075	84	15		1	16	70	15	0	0
CV	CV	24	99	.005									
Bayes LSD .05		77	91	.004	ns	18		0	ns	ns	17	4	ns
Russet Variety Names (4)													
BelRus (Std.)	ne	136	58	1.080	42	8 oz		3	58	38	4	0	0
ND1538-1 Rus	nd	299	190	1.061	71	22		7	29	49	19	3	0
Norgold Russet	nd	236	114	1.062	54	8		6	46	46	8	0	0
Russet Burbank	nd	249	101	1.069	70	13		22	30	56	13	0	0
CV	CV	20	23	.005									
Bayes LSD .05		72	41	.005	23	10		ns	23	ns	9	ns	ns

(1) All plots were harvested on August 13.

(2) nb = Nebraska, mn = Minnesota, wi = Wisconsin, ne = Sangerville Farm, nd = North Dakota.

(3) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4.

(4) Size 1 = Under 4 oz, S2 = 4 to 8 oz, S3 = 8 to 12 oz, S4 = 12 to 16 oz, and S5 = Over 16 oz.

New Jersey Table 13. Plant and Tuber Characters, Tuber Defects, Chip Color and Overall Rating for 19 Potato Varieties Grown in Bridgeton, NJ - 1990 (1).

Variety	P L A N T				&	TUBER CHARACTERS				T U B E R												O V E R		
	T S		A P			C	T S		D A		U	E	S	G	C	S	H	G	S	H	N	R	C C	A L L
	Y	Z	A	P			L	X	S	D														
LAL12-59	6	7	8	6	4	2	6	3	4	5	4	7	9	7	5	9	7	9					9	4
MN-12966	5	6	5	4	2	2	8	4	7	7	6	7	9	7	7	9	9	9					9	6
MN-13540	5	6	4	4	4	7	8	6	6	7	7	7	8	7	7	9	9	9					9	5
MN-13740	3	3	4	4	2	8	8	4	6	7	7	8	9	8	3	9	9	9					9	7
MS401-1	6	6	4	2	1	6	7	2	8	7	8	5	9	9	9	9	9	9					9	4
MS402-8	7	3	3	2	2	7	6	4	6	7	7	7	9	9	9	9	9	9					9	5
ND1196-2 Red	5	6	4	1	1	2	8	2	8	7	8	7	9	9	6	9	9	9					9	6
ND2008-2	5	5	6	2	1	8	8	3	5	6	5	7	9	9	7	9	7	9					3	6
W-856	5	5	5	7	5	9	8	6	5	7	6	8	9	7	5	9	9	9					1	5
W-870	5	7	7	5	7	8	7	5	5	7	7	8	9	7	8	9	7	8					1	8
W-877	7	6	6	7	7	7	8	4	5	6	7	7	9	9	5	9	9	9					13	4
Norchip	7	5	6	5	5	8	8	2	7	5	4	4	6	9	8	9	9	9					2	3
Red Norland	4	5	3	1	1	2	8	3	7	8	8	8	8	9	9	9	9	9					9	7
Red Pontiac	7	7	7	5	7	2	8	5	7	3	3	2	5	9	3	7	9	9					1	3
Superior	6	6	6	5	2	7	6	3	7	7	6	4	7	9	9	9	9	9					4	6
BelRus	7	7	7	7	7	5	2	8	5	8	7	8	9	9	7	9	9	9					3	3
ND1538-1 Rus	7	5	6	6	7	5	2	8	5	6	5	8	7	7	8	9	9	9					9	7
Norgold Russet	4	5	4	6	6	5	6	7	6	6	5	8	7	9	9	7	9	9					9	6
Russet Burbank	7	9	8	6	8	5	4	9	7	1	1	6	2	7	3	9	9	9					1	1

(1) See New Jersey Table 3 for all Plant and Tuber Characteristics.

New Jersey Table 14. Yields, Specific Gravities, and Tuber Sizes for 92 Round Potato Selections Grown on a Sandy Loam Soil at the Rutgers Research & Dev. Center - Bridgeton, NJ 1990 (1).

Variety Name	Seed Source (2)	Total Yield cwt/a	Market Yield		Spec. Grav.	% O v e r			% Culls	% Tuber Sizes (3)				
			cwt/a	% of Sup.		1	7/8	2 1/2		1	2	3	4	5
AF 875-15	me	326	308	161	1.079	95	33		0	5	62	30	3	0
AF 875-16	me	259	174	90	1.084	84	12		4	16	72	12	0	0
AF1377- 6	me	362	341	178	1.080	94	38		0	6	56	33	4	0
AF1424- 1	me	259	243	127	1.088	94	46		0	6	48	37	9	0
AF1425- 2	me	350	326	170	1.067	93	24		0	7	69	21	4	0
AF1433- 4	me	225	189	98	1.069	84	7		0	16	77	7	0	0
AF1437- 1	me	382	348	182	1.060	93	33		2	7	60	33	0	0
AF1443- 1	me	317	282	147	1.066	89	24		0	11	66	22	2	0
B0176-24	us	266	252	131	1.089	95	51		0	5	44	37	14	0
B0564- 6	us	326	278	145	1.077	89	36		4	11	54	30	5	0
B0564- 8	us	310	275	143	1.087	89	33		0	11	56	26	8	0
B0564- 9	us	370	346	181	1.080	93	58		0	7	36	47	11	0
B0583- 2	us	335	315	164	1.088	94	42		0	6	52	38	4	0
B0583- 8	us	322	287	150	1.089	89	22		0	11	68	22	0	0
B0585- 5	us	285	271	141	1.077	98	66		2	2	32	46	19	0
B0588- 2	us	268	250	130	1.090	95	28		2	5	67	28	0	0
B0610- 6	us	248	227	118	1.076	96	35		4	4	61	29	5	0
B0613-10	us	234	201	105	1.079	86	10		0	14	75	10	0	0
B0622- 2	us	275	249	130	1.076	91	36		1	9	55	36	0	0
B0635- 6	us	272	246	128	1.084	92	43		1	8	49	40	3	0
B0676- 7	us	257	250	130	1.076	97	64		0	3	33	51	13	0
B0687-14	us	359	305	159	1.082	86	16		1	14	69	13	3	0

(1) All plots were harvested on August 1.

(2) me = Univ. of Maine, us = USDA Chapman Farm.

(3) Size 1 = Under 1 7/8, S2 = 1 7/8 TO 2 1/2, S3 = 2 1/2 to 3 1/4, S4 = 3 1/4 TO 4, and S5 = Over 4.

New Jersey Table 15. Plant and Tuber Characters, Tuber Defects, Chip Color and Overall Rating for
95 White Potato Varieties Grown in Bridgeton, NJ - 1990 (1).

Variety	P L A N T					&		TUBER CHARACTERS					T U B E R D E F E C T S										OVER		
	T	S	A	A	M	C	T	S	D	A	U	E	S	G	S	H	G	S	H	H	N	R	C	C	ALL
	y	z	p	p	t	l	x	h	p	p	n	y	G	C	S	S	R	B	H	N	R	C	C	ALL	
AF 875-15	5	6	6	2	6	8	8	2	8	8	8	7	9	9	6	9	9	9				9	35	8	
AF 875-16	5	6	5	3	5	8	8	2	8	7	7	8	9	9	5	9	9	9				9		6	
AF1377- 6	7	8	7	2	5	8	8	3	7	7	6	6	9	9	6	9	9	9	2			9	5-	7	
AF1424- 1	8	8	7	7	9	8	7	2	7	7	7	7	9	9	2	9	9	9				9	44	7	
AF1425- 2	7	6	7	1	3	8	8	2	7	8	8	8	9	9	4	9	7	9				9	35	7	
AF1433- 4	6	6	4	1	3	7	7	2	8	8	8	8	9	9	9	9	9	9				9		7	
AF1437- 1	7	6	7	2	3	8	7	2	6	8	7	7	9	7	6	9	9	9				9	8-	7	
AF1443- 1	5	7	6	1	3	8	8	2	7	8	8	7	9	9	8	9	9	9				9	2-	7	
B0176-24	5	7	6	4	6	8	8	3	8	7	6	8	9	9	3	9	9	9				9	5-	7	
B0564- 6	7	7	7	7	9	7	7	3	7	6	7	6	6	9	5	6	9	9			2	8	35	7	
B0564- 8	5	8	7	7	6	7	7	2	8	8	8	7	9	9	8	9	9	9				9	33	8	
B0564- 9	6	8	7	6	6	7	7	2	8	8	7	7	9	9	5	9	9	9	1			9	54	9	
B0583- 2	6	6	7	5	8	7	6	2	8	7	7	7	7	9	4	7	9	9				9	6-	8	
B0583- 8	6	7	6	6	7	7	7	2	7	7	7	7	9	9	3	9	9	9	2			9	6-	8	
B0585- 5	4	6	6	6	6	8	7	2	7	6	7	7	9	7	7	9	9	9	2			9	24	8	
B0588- 2	6	6	7	4	4	7	7	2	7	7	8	8	9	9	5	9	9	9	1			9	43	8	
B0610- 6	6	5	6	5	6	7	6	2	8	8	8	8	9	7	6	9	9	9				9		7	
B0613-10	3	5	6	1	3	8	8	2	6	7	6	6	8	9	4	9	9	9	1			9		6	
B0622- 2	7	6	5	3	5	8	8	2	7	7	7	7	7	9	5	9	9	9				9		7	
B0635- 6	6	7	6	4	5	7	6	3	6	6	7	6	9	9	3	9	9	9	4			9	36	7	
B0676- 7				4	5	8	8	3	7	7	7	8	9	9	6	9	8	9				9		7	
B0687-14	3	7	8	5	6	8	8	2	5	7	7	6	9	9	4	9	9	9				9		8	

(1) See New Jersey Table 3 for all Plant and Tuber Characteristics.

NEW YORK - LONG ISLAND

J. B. Sieczka, D. D. Moyer, J. M. Kossowski and R. C. Neese

- Introduction:** Experiments conducted in 1990 are part of an ongoing program evaluating promising golden nematode resistant and russet type potato clones under Long Island conditions. Eighty-five potato clones were evaluated in replicated experiments conducted at the Long Island Horticultural Research Laboratory and at Corwith Farms, Water Mill, New York. Data were collected on total and marketable yields, size distribution, internal and external defects and general appearance of potato tubers. Two promising clones were grown at four nitrogen rates (0, 75, 150, and 225 lbs/A) to determine the effect of nitrogen rate on yield and quality and to establish optimum foliar nitrogen levels.
- Early:** Onaway, AF845-11, E55-44, and F24-12 produced significantly higher marketable yields than the standard, 'Superior' (Tables 2 and 3). The best appearing clones in the experiment were F24-12 and FG6-15. The worst appearing clone was Onaway. The tuber specific gravity of AF875-15, E55-27 and E55-44 was greater than 1.080.
- NE107 Main Season:** Allegany and AF1060-2 produced the highest marketable yields (Tables 4 and 5). AF1060-2 tubers are smaller, in general, than Allegany. The percentage of tubers in the 2.5 to 4 inch size for Allegany was 58 while only 30% of AF1060-2 tubers fell into this size. Other entries that produced significantly higher yields than Katahdin are: AF828-5, LA01-38, Atlantic, Kennebec and F77087. The appearance rating of LA01-38 tubers was very low. Atlantic, E57-13 and F77087 tubers had an unacceptably high percentage of internal defects.
- Advanced White-skinned Clones:** The highest marketable yields were produced by NorWis and B0233-1 (Tables 6 and 7). These clones are the only ones which produced yields greater than Katahdin. Tubers of E55-27 had the highest specific gravity in the experiment. NorWis tubers had poor appearance and were plagued with internal defects.
- Water Mill:** Allegany, NorWis, AF1060-2, AF828-5 and NY84 produced significantly higher marketable yields than Katahdin (Tables 8 and 9). NorWis produced a high percentage of large, irregularly shaped tubers. AF1060-2 tubers were small and Allegany tubers were mostly in the medium-sized range. The two russet clones tested, Coastal Russet and Hilite Russet, produced yields considerably lower than the white-skinned clones.
- Early Selection-Cornell:** Only H35-45 of the early selection clones produced marketable yields that were not significantly different than Katahdin (Tables 10 and 11). All other entries produced lower yields. Tubers of H57-201 and K248-2 had specific gravity greater than 1.080.
- Red-skinned Clones:** Reddale, NDT9-1068-1 and LA12-59 demonstrated the highest yield potential (Tables 12 and 13). Reddale tubers, however, have deep eyes and irregular shape, a light red skin and a tendency toward brown center. Other entries with a tendency toward hollow-heart and/or brown center are Cherry Red, LaRouge, Purple 4 and B0615-1. The most attractive reds were Redsen, ND2224-5R, NDT9-1068-1, B0616-1 and Purple 5.

NE107 Russet:	Russet Burbank produced the highest total and marketable yields and had the highest specific gravity (Tables 14 and 15). It also produced the highest percentage of misshapen tubers and had the lowest appearance rating. The next highest yielding clone was B0220-14, however, 47% of the tubers cut were hollow. Internal defects were a problem in all clones except Russet Norkotah (Tables 14 and 15).
USDA Russet:	The highest marketable yields were produced by B0012-7 and B9922-11 (Tables 16 and 17). The highest specific gravity was produced by B9932-50. This clone had a tendency toward hollow heart. All entries had internal defects except B0324-5 and B9922-11. A74114-4 is expected to be named as Frontier Russet.
Yellow-fleshed:	All entries produced a high percentage of small tubers (Tables 18 and 19). Yukon Gold and Rose Gold tubers had the best appearance scores. Twenty-three percent of Yukon Gold and Carolla tubers had internal defects.
Variety x Nitrogen Study:	The total yield of Allegany and B7592-1 (soon to be named Castile) were approximately the same (Table 20). Allegany, however, produced significantly higher yields of two to four inch tubers. Total and marketable yields of both clones were greatest at 150 lbs N/A. Tuber specific gravity was lowest when nitrogen was not used. Leaf and petiole nitrogen data are being evaluated and compared to levels in an upstate N.Y. experiment to determine optimal levels.
Storage Results:	After-cooking darkening and blackspot ratings for clones grown in 1989 are given in Table 21.
Observation:	Comments on early selection, 20 hill plots are listed in Table 22.
Acknowledgements:	Seed was provided by R. L. Plaisted, Cornell University; K.G. Haynes, USDA; G. A. Porter, University of Maine; Windy Mountain Farm, Lake Placid, N.Y.; and W. C. Mehlenbacher, Castile, N.Y. Special thanks are extended to the Corwith Brothers for providing the land and assistance in the establishment of the experiment on the South Fork and to John Babinski for the use of harvest equipment. The assistance of Bennett Orlowski, Rod Zeltmann, Mark Sisson, Gloria Stoetzel, Sandi Mulvaney, and Carole Morini is greatly appreciated.

Long Island Table 1.

Tuber characteristics of potato clones grown on Long Island, N.Y. -1990.

CLONE	Table	Col.	Tex.	Shape	Tuber Depth	Eye Depth		Comments
						Lat.	Apical	
Allegany	4,5,8,9	Bu	SN	R	R	S	D	Sl Irr, DAE
Atlantic	4,5	Bu	N	R	R	S	D	DSE, Irr
BelRus	14-17	DB	HR	L	SF	S	S	Allig Hide, L
Carola	18,19	W	S	O	SF	S	M	Pear,Irr,Sp
Cherry Red	12,13	DR	N	O-R	MT	M-S	M-S	Scaly,Sk,Sl Irr
Chieftain	12,13	LR	S	O-R	MT	S	S	Sk
Coastal Russet	8,9,14,15	B	L-MR	L	SF	S	S	PE, Sl Irr
Conestoga	2,3	W	SN	R-O	MT	S	S	Some Sc,SED
HiLite Russet	8,9,14,15	B	MR	L	MT	S	S	Sl Irr
Hudson	4,5,8,9	W	S	R-O	SF	S	M	Irr, PE, L, Sc
Katahdin	4-11	W	S	R-O	SF	S	M	PE, Sl Irr, Sc, St
Kennebec	4,5	W	S	O	SF	S	M	Sl Irr PE, L
LaRouge	12,13	LR	S	O-R	F	D	D	Irr, Sk
NemaRus	16,17	B	M-HR	L	MT	S	S	L,PE
Norchip	2,3	W	S	R	MT	M	M	Irr, Kn
Norland	12,13	Pi	S	R-O	MT	S	M	Irr, Sm
NorWis	6-9	W	S	O-R	F	D	D	Irr
Onaway	2,3	W	S	R	R	D	D	Irr,L
Purple 4	12,13	LPu	S	R-O	SF	S	S	Irr,Sk
Purple 5	12,13	Pu	S	O	MT	S	S	Not Sk
R. Burbank	14,15	B-T	PR	L	SF	S	S	Irr, Kn
R. Norkotah	14,15	B	MR	L	MT	S	S	Sl Irr, PE
Red Cloud	12,13	MR	RS	O	MT	M	M	Pointed,Irr
Red Gold	18,19	Pi	SN	R	R	M	M	Irr
Reddale	12,13	Pi	S	O	F	D	D	Irr, Sk
Redsen	12,13	DR	S	R	R	S	S	Nice,Sm
Rose Gold	18,19	Pi-W	S	R-O	M	S	S	
Saginaw Gold	18,19	W	S	R-O	MT	S	M	Irr
Sangre	12,13	DR	N	O	MT	S	M	Irr, St
Superior	2,3,6-11	Bu	SN	O-R	SF	M	D	Irr, L, SS, Sp
Yukon Gold	18,19	W(Pi)	S	R-O	MT	S	M	Sl Irr, (Pink eyes)
A74114-4	14,15	T-B	L-PR	O-L	MT	S	S	Irr
AF1060-2	4,5,8,9	Bu	SN	R	R	S	M	Irr, CT, St, DSE, Sm
AF828-5	4,5,8,9	W	RS	R-O	SF	S	M	Sl Irr, Rot
AF845-11	2,3	Bu	SN	R	MT	S	M	Irr, PE, L
AF875-15	2,3	W	RS	R-O	MT	M	M	Irr, L
B0012-7	16,17	DB	HR	L	MT	S	S	Blocky,OK
B0033-23	12,13	MR	N	R	R	S	S	Sm,Kn
B0220-14	14,15	B	MR	L	SF	S	S	OK, White Buds
B0233-1	6,7	Bu	SN	O	SF	S	D	Irr,PE
B0257-12	6,7	W	RS	R	R	S	M	Sl Irr,DSE,Sc

COLOR: B=brown, Bu=buff, Pi=pink, Pu=purple, R=red, T=tan, W=white. Modifiers: L=light, M=medium, D=dark.

TEXTURE: N=netted, R=russet, S=smooth, SN=slightly netted. Modifiers: L=light, H=heavy, M=moderate,

P=partial, R=relatively.

TUBER DEPTH: F=flat, MT=medium thick, R=round, SF=slightly flattened.

SHAPE: L=long, O=oblong, R=round.

EYE DEPTH: D=deep, M=moderate, S=shallow.

COMMENTS: Allig=alligator, CT=chain tubers, DAE=deep apical eyes, Dk=decay, DSE=deep stem end, Irr=irregular,

JER=jelly end rot, Kn=knobs, L=prominent lenticels, Lg=large, MDSE=moderately deep stem end, PE=pinkeye,

Sc=scab, SED=stem end decay, SEKn=stem end knobs, Sl=slightly, Sk=skinned, Sm=small, Sp=sprouts,

SS=silver scurf, St=stolons.

Continued on the next page

Long Island Table 1. cont Tuber characteristics of potato clones grown on Long Island, N.Y. -1990.

CLONE	Table	Col.	Tex.	Shape	Tuber Depth	Eye Depth		Comments
						Lat.	Apical	
B0312-10	16,17	DB	HR	L	SF	S	S	Irr,Sc,SED
B0324-5	16,17	DB	HR	L-O	MT	S	S	Irr,Sm
B0425-5	16,17	DB	HR	L-O	MT	S	S	Blocky,SED,Irr
B0615-1	12,13	LR	RS	R	MT	M	M	Sk,Irr
B0615-2	12,13	LR	SN	R	R	S	M	Irr,Sk
B0616-1	12,13	MR	RS	R	R	S	S	Nice
B0622-2	6,7	W	S	R	R	M	M	Irr,Sp,SED
B9922-11	16,17	DB	HR	L-O	MT	S	S	Blocky,Sl Irr
B9932-50	16,17	DB	HR	L-O	MT	S	S	Sl Irr,Rot,Sm
B9935-10	4,5	Bu	N	R	R	M	M	MDSE
E11-45	6,7	W	S	R-O	MT	S	S	Irr,L
F143-1(Rus)	16,17	B	HR	L-O	MT	S	S	Sl Irr
F24-12	2,3	W	RS	O-R	MT	S	S	Sl Irr
F77087	4,5	Bu	SN	O	SF	M	M	Irr, PE Irr, some white
F82026	18,19	W	RS	R-O	SF	S	M	Sc, L
FG6-15	2,3	W	RS	O	SF	S	S	Pear
G76-29	6,7	W	RS	R	MT	S	M	OK,Sl Irr,Sc,L
G76-31	6,7	W	S	R	MT	S	S	OK,DSE
G77-1	6,7	W	RS	R-O	MT	S	M	Sl Irr,Pear
H35-45	10,11	Bu	SN	R	R	S	S	DSE,L,SED
H51-19	10,11	W	S	R	R	S	S	DSE,SED,Irr
H51-34	10,11	W	S	R-O	MT	S	S	Sl Irr,SS
H51-43	10,11	W	S	O-R	MT	S	M	Some Sc
H51-7	10,11	W	S	R	MT	M	M	Sl Irr,DSE
H51-9	10,11	W	RS	R-O	MT	S	S	DSE,Dk,Sc
H57-181	10,11	W	S	O	MT	S	S	Kidney,JER,Irr
H57-201	10,11	Bu	S	O-R	MT	S	S	Nice,Some SED
H57-38	10,11	W	RS	R-O	R	S	S	L,Pear
H87-220	10,11	Bu	SN	R	MT	S	M	Superior-like
K248-2	10,11	Bu	RS	R-O	MT	S	S	L,Sl Irr,DSE
K330-5	10,11	W	S	O-R	SF	S	S	Irr,Kn,SS,
LA 12-59	12,13	DR	S	R-O	MT	M	M	Sk,Irr
LA01-38	4,5	Bu	SN	O	F	M	M	Ugly, Sp, Irr, L
ND2224-5R	12,13	DR	S	R-O	R	S	S	Not Sk,Sm
ND671-4	14,15	B	MR	L	MT	S	S	OK, Sl Irr
NDT9-1068-11R	12,13	DR	S	R-O	MT	S	S	Nice but Sk
NY78	4-9	W	RS	R-O	MT	S	M	OK, St, Sl Irr, Sc, PE
NY84	4-9	W	RS	R-O	MT	S	M	Sl Irr, SED, Pear, L, Sc
NYE55-27	2,3,6,7	Bu	SN	R	MT	S	M	Sl Irr, Pear, Sm, SS, DSE
NYE55-44	2,3,6-9	Bu	SN	R	MT	S	M	Sl Irr, Pear, PE, L
NYE57-13	4-9	W	S	R	MT	S	M	Sl Irr, PE, L, Sm

COLOR: B=brown, Bu=buff, Pi=pink, Pu=purple, R=red, T=tan, W=white. Modifiers: L=light, M=medium, D=dark.

TEXTURE: N=netted, R=russet, S=smooth, SN=slightly netted. Modifiers: L=light, H=heavy, M=moderate,

P=partial, R=relatively.

TUBER DEPTH: F=flat, MT=medium thick, R=round, SF=slightly flattened.

SHAPE: L=long, O=oblong, R=round.

EYE DEPTH: D=deep, M=moderate, S=shallow.

COMMENTS: Allig=alligator, CT=chain tubers, DAE=deep apical eyes, Dk=decay, DSE=deep stem end, Irr=irregular,

JER=jelly end rot, Kn=knobs, L=prominent lenticels, Lg=large, MDSE=moderately deep stem end, PE=pinkeye,

Sc=scab, SED=stem end decay, SEKn=stem end knobs, Sl=slightly, Sk=skinned, . Sm=small, Sp=sprouts,

SS=silver scurf, St=stolons.

Long Island Table 2. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for early season white-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Total Yield cwt/A	Marketable Yield		Size Distribution by Class (%)					Size Distribution		Specific Gravity	
		cwt/A	percentage of standard	< 2"	2 - 2.5"		2.5 - 3.25"		> 4"	2 to 4 in.		2.5 to 4 in.
Early - 125 days												
Superior	476	320	100	30	42	28	0	0	70	28	74	
Conestoga	411	291	91	21	34	45	0	0	79	45	80	
Norchip	470	269	84	39	44	17	0	0	61	17	79	
Onaway	601	459	144	13	27	52	7	0	87	59	69	
AF845-11	528	403	126	20	34	45	1	0	80	46	78	
AF875-15	436	259	81	35	38	27	1	0	65	27	82	
E55-27	522	351	110	32	43	25	0	0	68	25	86	
E55-44	531	425	133	18	39	43	0	0	82	43	83	
F24-12	542	441	138	17	44	38	0	0	83	39	74	
FG6-15	480	356	111	25	47	28	0	0	75	28	70	
<i>Waller-Duncan</i>												
LSD (0.05)	(28)	(37)									(3)	

Long Island Table 3. Maturity, tuber shape, and internal and external defects, for early season white-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Maturity on 8/15/90*	Tuber Data*		Tuber Defects (%)					Percentage				
		Shape	Appear- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Other**	Hollow heart	Brown center	Internal Necrosis		
											Sl.	Mod. Sev.	
<u>Early - 125 days</u>													
Superior	2	O-R	5	3	0	2	0	0	0	0	15	0	0
Conestoga	2	R-O	6	9	0	2	2	5	0	0	8	3	3
Norchip	3	R	5	4	0	4	0	0	0	0	8	8	0
Onaway	3	R	3	11	3	4	3	1	0	0	3	0	0
AF845-11	3	R	5	4	0	1	0	2	0	0	0	0	0
AF875-15	2	R-O	5	6	1	2	2	0	3	3	0	0	0
E55-27	2	R	6	1	0	0	0	0	0	0	0	0	0
E55-44	3	R	6	2	1	1	0	0	8	0	0	0	0
F24-12	3	O-R	8	1	1	0	0	0	8	0	8	0	0
FG6-15	2	O	8	1	0	0	0	0	3	0	3	0	0

* See rating system outlined in the text.

** Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 5. Maturity, tuber shape, and internal and external defects, for main season white-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Maturity on 8/15/90*	Tuber Data*		Tuber Defects (%)					Percentage			
		Shape	Appear- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Other**	Hollow heart	Brown center	Internal Necrosis Sl. Mod.	Sev.
Main Season - 153 days												
Katahdin	5	R-O	7	2	1	0	0	1	0	0	3	0
Allegany	7	R	6	1	0	0	0	0	5	0	3	0
Atlantic	4	R	6	1	0	1	1	0	5	3	8	13
Hudson	4	R-O	6	11	2	1	1	7	8	3	0	0
Kennebec	5	O	5	8	3	1	1	3	3	0	10	3
AF828-5	5	O	7	3	1	2	1	0	8	0	8	0
AF1060-2	5	R	6	2	1	1	0	1	0	0	5	0
B9935-10	2	R	6	1	0	0	0	0	8	0	0	0
E57-13	3	R	6	11	1	1	0	9	53	0	0	0
F77087	5	O	5	11	2	2	0	7	30	0	5	0
LA01-38	5	O	3	10	1	5	0	3	0	0	10	0
NY78	4	R-O	8	1	0	0	0	0	0	3	3	0
NY84	3	R-O	7	3	0	2	0	1	0	0	3	3

* See rating system outlined in the text.

** Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 6. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for advanced white-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of standard	Size Distribution by Class (%)					Size Distribution		Specific Gravity	
			< 2"	2 - 2.5"	2.5 - 3.25"	3.25 - 4"	> 4"	2 to 4 in.	2.5 to 4 in.		
Advanced White - 153 days											
Katahdin	635	480	100	22	42	33	2	0	78	35	68
Superior	570	436	91	23	50	28	0	0	77	28	74
NorWis	679	584	122	4	19	54	14	9	87	68	66
B0233-1	693	622	130	7	38	39	15	0	92	54	72
NY78	414	348	73	12	34	50	4	0	88	54	59
NY84	640	492	103	21	46	31	2	0	79	33	59
E11-45	655	440	92	31	45	23	0	0	69	23	59
E55-27	515	321	67	37	48	15	0	0	63	15	81
E55-44	563	444	93	19	44	35	2	0	81	37	77
E57-13	507	359	75	28	49	23	0	0	72	24	73
G76-29	468	330	69	28	46	26	1	0	72	27	74
G76-31	398	272	57	31	49	20	0	0	69	20	73
G77-1	470	354	74	22	42	35	0	0	78	35	74
<i>Waller-Duncan</i>											
LSD (0.05)	(72)	(67)									(2)
B0257-12*	564	472	100	10	37	48	5	0	90	53	76
B0622-2*	534	455	96	14	42	43	1	0	86	44	75

* Data are from 3 replications and were not analyzed statistically.

Long Island Table 7. Maturity, tuber shape, and internal and external defects, for advanced white-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Maturity on 8/15/90*	Tuber Data*		Tuber Defects (%)					Percentage			
		Shape	Appearance	Total	Sun-burn	Mis-shapen	Growth cracks	Other**	Hollow heart	Brown center	Internal Necrosis	Sl. Mod. Sev.
Advanced White - 153 days												
Katahdin	5	R-O	6	2	1	0	0	1	10	0	0	3 0 0
Superior	2	R-O	5	1	0	1	0	0	0	0	3	0 0 0
NorWis	5	O-R	4	1	0	0	1	0	10	0	23	8 5 5
B0233-1	5	O	5	2	0	2	0	0	3	0	3	0 0 0
NY78	4	R-O	7	4	1	2	0	1	0	3	0	3 0 0
NY84	3	O-R	7	2	0	1	1	1	0	3	0	0 3 3
E11-45	4	R-O	6	1	0	1	0	0	3	5	5	0 0 0
E55-27	2	R	7	0	0	0	0	0	3	0	3	0 0 0
E55-44	2	R	7	2	0	1	1	0	0	0	3	0 0 0
E57-13	2	R	7	2	0	0	0	1	8	0	3	0 0 0
G76-29	2	R	7	2	0	0	1	1	0	0	8	0 0 0
G76-31	1	R	8	1	0	0	0	1	0	0	0	0 0 0
G77-1	2	R-O	7	2	0	0	0	1	0	0	0	0 0 0
B0257-12	3	R	7	6	0	2	3	1	0	3	0	0 0 0
B0622-2	2	R	5	0	0	0	0	0	10	23	0	0 0 0

* See rating system outlined in the text.

** Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Italics: Data collected from 3 replications.

Long Island Table 8. Yield, marketable yield, percentage of yield by grade, size distribution and tuber data for clones grown at Water Mill, N.Y. - 1990.

Clone	Total Yield cwt/A	Marketable Yield		Size Distribution by Class (%)			Maturity on 8/08/90*	Tuber Data*	
		cwt/A	percentage of standard	< 2"	2 - 4"	> 4"		Shape	Appearance
South Fork - 140 days									
Katahdin	522	417	100	19	80	0	8	R-O	7
Allegany	693	585	140	15	85	0	7	R	7
NorWis	624	545	131	9	89	2	8	O-R	5
Coastal Russet	433	182	44	54	46	0	6	L	6
HiLite Russet	431	217	52	48	52	0	5	L	7
Hudson	523	413	99	12	87	1	7	R-O	7
Superior	525	443	106	13	87	0	4	O-R	6
AF1060-2	741	546	131	24	76	0	8	R	7
AF828-5	590	517	124	11	89	0	7	R-O	7
E55-44	485	421	101	12	88	0	3	R	6
E57-13	445	337	81	23	77	0	3	R	7
NY78	466	369	89	19	81	0	7	R-O	7
NY84	608	507	122	16	84	0	6	R-O	7
Waller-Duncan									
LSD (0.05)	(87)	(65)							

* See rating system outlined in the text.

Long Island Table 9. External and internal defects of potato clones grown at Water Mill, N.Y. - 1990.

Clone	Tuber Defects (%)					Percentage				
	Total	Sun- burn	Mis- shapen	Growth		Hollow heart	Brown center	Internal Necrosis		
				cracks	Other*			Sl.	Mod. Sev.	
South Fork - 140 days										
Katahdin	1	0	0	0	0	0	0	0	0	0
Allegany	0	0	0	0	0	0	0	0	0	0
NorWis	2	0	0	0	2	7	3	3	3	0
Coastal Russet	4	0	4	0	0	0	3	0	3	0
HiLite Russet	2	0	2	0	0	3	0	0	0	0
Hudson	9	0	0	0	9	3	0	0	0	0
Superior	3	0	3	0	0	3	3	0	0	0
AF1060-2	2	0	2	0	0	0	0	0	0	0
AF828-5	2	2	0	0	0	0	0	3	0	0
E55-44	1	0	0	0	1	0	0	3	0	0
E57-13	2	1	0	0	1	3	0	0	0	0
NY78	1	1	0	0	0	0	0	3	0	3
NY84	0	0	0	0	0	0	0	7	0	0

* Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

[illegible]

Long Island Table 11. Maturity, tuber shape, and internal and external defects, for early selection Cornell lines grown at Riverhead, N.Y. - 1990.

Clone	Maturity on 8/15/90*	Tuber Data*		Tuber Defects (%)					Percentage			
		Shape	Appear- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Other**	Hollow heart	Brown center	Internal Necrosis Sl. Mod. Sev.	
Cornell - 131 days												
Katahdin	4	R-O	6	0	0	0	0	0	8	0	5	0
Superior	1	O-R	5	1	0	1	0	0	0	0	5	0
H35-45	2	R	5	3	0	0	1	2	0	0	0	0
H51-7	2	R	6	0	0	0	0	0	0	0	0	0
H51-9	1	R-O	6	2	0	0	0	1	0	3	0	0
H51-19	1	R	6	2	0	0	0	1	15	0	0	0
H51-34	1	R-O	6	1	0	1	0	0	0	0	5	0
H51-43	1	O-R	7	1	0	0	0	1	5	0	5	0
H57-38	2	R-O	6	2	0	1	0	1	0	0	0	0
H57-181	2	O	5	3	0	1	0	2	0	0	15	0
H57-201	2	O-R	7	1	0	0	0	0	0	0	30	23
H87-220	2	R	6	0	0	0	0	0	0	3	3	8
K248-2	2	R-O	6	1	0	0	0	1	0	3	0	5
K330-5	2	O-R	5	0	0	0	0	0	0	0	0	0

* See rating system outlined in the text.

** Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 13. Maturity, tuber shape, and internal and external defects, for red-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Maturity on 8/15/90*	Tuber Data*		Tuber Defects (%)					Percentage				
		Shape	Appear- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Other**	Hollow heart	Brown center	Internal Necrosis		
											Sl.	Mod. Sev.	
Red-skinned - 152 days; 4 replications.													
Chieftain	3	O-R	7	0	0	0	0	0	0	5	23	15	0
Cherry Red	3	O-R	6	2	0	0	1	1	23	5	3	3	0
LaRouge	4	O-R	4	1	0	1	0	0	0	30	3	0	0
Norland	1	R-O	6	1	0	0	0	0	0	0	5	0	0
Purple 4	1	O-R	6	0	0	0	0	0	0	15	10	0	0
Purple 5	1	O	8	0	0	0	0	0	0	3	3	0	0
Reddale	2	O	4	1	0	0	0	0	0	25	0	0	0
Redsen	2	R	9	1	0	1	0	0	0	0	3	0	0
Sangre	4	O	7	0	0	0	0	0	0	0	10	0	0
B0033-23	1	R	7	2	0	0	1	1	0	0	0	0	0
B0615-1	2	R	6	2	0	2	0	0	0	35	3	3	0
ND2224-5R	1	R-O	8	0	0	0	0	0	0	0	0	0	0
NDT9-1068-11R	3	R-O	8	3	0	1	1	0	0	3	8	0	0
Red-skinned - 152 days; 3 replications.													
Chieftain	3	O-R	7	0	0	0	0	0	0	7	27	10	0
Red Cloud	4	O	4	4	0	3	1	0	0	0	3	0	0
B0615-2	1	R	6	0	0	0	0	0	0	3	0	0	0
B0616-1	1	R	8	0	0	0	0	0	0	0	3	0	0
LA 12-59	2	R-O	6	0	0	0	0	0	0	0	0	0	0

* See rating system outlined in the text.

** Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 14. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for NE107 russet-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Total Yield cwt/A	Marketable Yield percentage of standard	Size Distribution by Class (%)					Size Distribution			Specific Gravity
			< 4 oz	4 to 8 oz	8 to 12 oz	12 to 16 oz	> 16 oz	4 to 16 oz	8 to 16 oz		
NE107 Russet - 153 days											
R. Burbank	637	350	100	28	46	23	2	0	72	25	79
BelRus	334	193	55	41	48	11	1	0	59	12	76
Coastal Russet	433	269	77	37	54	8	1	1	63	9	66
HiLite Russet	468	282	81	40	49	10	2	0	60	12	69
R. Norkotah	463	262	75	40	49	11	1	0	60	11	70
A74114-4	332	196	56	38	50	10	3	0	62	13	75
B0220-14	399	301	86	22	50	24	3	1	77	27	74
ND671-4	459	269	77	40	44	13	3	0	60	16	68
Waller-Duncan											
LSD (0.05)											
(88) (61) (4)											

Long Island Table 15. Maturity, tuber shape, and internal and external defects, for NE107 russet-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Maturity on 8/15/90*	Tuber Data*		Tuber Defects (%)					Percentage				
		Shape	Appear- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Other**	Hollow heart	Brown center	Internal Necrosis		
											Sl.	Mod. Sev.	
NE107 Russet - 153 days													
R. Burbank	6	L	3	20	0	19	0	0	0	30	0	0	0
BelRus	2	L	7	1	0	0	0	1	1	20	0	3	0
Coastal Russet	3	L	7	1	0	0	0	0	0	0	0	10	7
HiLite Russet	1	L	7	0	0	0	0	0	0	13	0	0	0
R. Norkotah	2	L	8	3	0	2	0	1	1	3	0	0	0
A74114-4	4	O-L	6	4	1	2	0	1	1	20	0	0	0
B0220-14	2	L	7	2	0	0	1	0	0	47	0	0	0
ND671-4	2	L	7	2	0	1	0	0	0	17	0	3	0

* See rating system outlined in the text.

** Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 16. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for USDA russet-skinned clones grown at Riverhead, N.Y. - 1990.

Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of standard	Size Distribution by Class (%)					Size Distribution			Specific Gravity
			< 4 oz	4 to 8 oz	8 to 12 oz	12 to 16 oz	> 16 oz	4 to 16 oz	8 to 16 oz		
USDA Russet - 131 days											
BelRus	362	224	100	37	51	10	2	0	63	11	74
NemaRus	396	286	128	22	49	23	3	3	75	26	72
B0012-7	417	337	150	18	48	26	8	0	82	34	75
B0312-10	359	227	102	23	45	21	7	3	73	28	66
B0324-5	298	171	76	40	51	6	3	1	59	9	78
B0425-5	341	210	94	21	44	20	10	5	74	30	63
B9922-11	413	308	137	24	59	14	2	0	75	17	79
B9932-50	404	270	121	28	54	14	3	2	71	17	80
F143-1(Rus)	374	269	120	25	54	19	1	1	74	20	72
Waller-Duncan											
LSD (0.05)	(37)	(41)	(3)								

Long Island Table 17. Maturity, tuber shape, and internal and external defects, for USDA russet-skinned clones grown at Riverhead, N.Y. - 1990.

Growth at Kulevskaya, Nov. 1, 1996.													
Clone	Maturity on 8/15/90*	Tuber Data*		Tuber Defects (%)					Percentage				
		Shape	Appear- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Other**	Hollow heart	Brown center	Internal Necrosis		
											Sl. Mod.	Sev.	
USDA Russet - 131 days													
BelRus	2	L	7	1	1	0	0	0	1	13	0	0	0
NemaRus	2	L	6	3	0	1	0	0	1	33	3	0	0
B0012-7	3	L	7	1	0	1	0	0	0	33	0	8	3
B0312-10	3	L	6	11	2	2	2	5	63	3	3	0	0
B0324-5	2	O-L	6	2	0	1	0	0	0	0	0	0	0
B0425-5	2	O-L	6	14	3	2	8	1	45	10	3	0	0
B9922-11	3	O-L	7	1	0	0	1	0	8	0	0	0	0
B9932-50	3	O-L	6	4	0	2	1	1	70	0	0	0	0
F143-1(Rus)	2	O-L	7	2	0	1	1	0	10	5	0	5	0

* See rating system outlined in the text.

** Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 18. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for yellow-fleshed clones grown at Riverhead, N.Y. - 1990.

Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of standard	Size Distribution by Class (%)					Size Distribution		Specific Gravity	
			< 2"	2 - 2.5"	2.5 - 3.25"	3.25 - 4"	> 4"	2 to 4 in.	2.5 to 4 in.		
Yellow-fleshed - 153 days											
Yukon Gold	412	347	100	14	40	40	6	0	86	46	76
Carola	612	443	128	21	51	23	4	0	79	28	71
Red Gold	424	274	79	31	42	25	2	0	69	27	73
Rose Gold	573	427	123	47	36	17	0	0	53	17	74
Saginaw Gold	497	316	91	33	49	19	0	0	67	19	76
F82026	540	343	99	34	54	11	1	0	66	11	78
Waller-Duncan											
LSD (0.05)	(73)	(85)									(4)

Long Island Table 19. Maturity, tuber shape, and internal and external defects, for yellow-fleshed clones grown at Riverhead, N.Y. - 1990.

Clone	Maturity on 8/15/90*	Tuber Data*	Tuber Defects (%)						Percentage					
			Shape	Appear- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Other**	Hollow heart	Brown center	Internal Necrosis		
												Sl.	Mod.	Sev.
Yellow-fleshed - 153 days														
Yukon Gold	2	R-O	7	1	0	0	0	1	10	3	0	0		
Carola	4	O	5	7	1	5	0	1	10	7	3	0		
Red Gold	3	R	5	5	0	4	1	0	0	0	0	0		
Rose Gold	2	R-O	7	0	0	0	0	0	3	0	0	0		
Saginaw Gold	2	R-O	6	4	1	3	0	0	0	7	3	0		
F82026	4	R-O	6	2	0	1	1	0	7	3	0	0		

* See rating system outlined in the text.

** Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 20. The effect of nitrogen rate on yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for Allegany and Castile grown at Riverhead, N.Y. - 1990.

Clone	N Rate (lbs/A)	Total		Marketable Yield		Size Distribution by Class (%)					Size Distribution		
		Yield	cwt/A	cwt/A	percentage of standard*	< 2"	2 - 2.5"	2.5 - 3.25"	3.25 - 4"	> 4"	2 to 4 in.	2.5 to 4 in.	Specific Gravity
Allegany	0	187	125		47	33	44	22	1	0	67	23	62
Allegany	75	395	285		108	28	41	31	0	0	72	31	70
Allegany	150	460	371		140	19	34	46	1	0	81	47	75
Allegany	225	445	370		140	17	32	49	2	0	83	51	77
Castile	0	209	105		40	50	46	4	0	0	50	4	61
Castile	75	407	298		112	27	53	20	0	0	73	20	70
Castile	150	460	339		128	26	39	34	1	0	74	35	73
Castile	225	435	304		115	30	41	28	1	0	70	29	70

Significance

Variety	ns	*	**
N Rate	**	**	**
Variety x N	ns	ns	*

Waller-Duncan

LSD (0.05) (48) (46) (3)

* Standard = 265 cwt/A (New York State average)

Long Island Table 21. After-cooking darkening and blackspot ratings of clones grown in 1989.

NE107 Main-season			Cornell- White			USDA - White			USDA - Russet			NE107 - Russet			Red-skinned		
1989 Tables 3-4			1989 Tables 5-6			1989 Tables 7-8			1989 Tables 9-10			1989 Tables 11-12			1989 Tables 15-16		
Clone	ACD	BS	Clone	ACD	BS	Clone	ACD	BS	Clone	ACD	BS	Clone	ACD	BS	Clone	ACD	BS
Katahdin	4.8	6.0	Katahdin	4.8	6.0	Katahdin	4.9	6.0	BelRus	4.7	5.9	BelRus	4.6	5.8	Cheftain	4.8	6.0
Atlantic	4.3	5.7	Superior	4.7	5.8	B0172-22	4.6	5.9	Coastal Russet	4.0	5.9	Coastal	4.1	5.9	La Rouge	4.8	6.0
Hudson	4.4	5.7	NY72*	4.8	5.9	B0175-20	4.5	5.9	B0045-6	4.1	5.9	Russet Burbank	4.8	5.9	Norland	4.2	6.0
Kennebec	4.8	5.9	NY78	5.0	5.9	B0175-21	3.7	5.7	B0309-11	2.7	5.8	A74114-4	3.7	5.9	Norland (Dk Rd)	3.9	6.0
AF828-5	4.9	5.6	NY81*	4.7	5.9	B0178-34	4.3	5.9	B0319-26	4.5	6.0	B0045-6	4.0	5.8	Sangre	4.9	6.0
AF875-16	4.7	5.3	NY84	4.8	5.9	B0209-1	4.8	5.3	B0493-8	4.8	5.9	B0220-14	4.2	5.5	Purple 4	4.0	6.0
AF875-17	4.4	5.7	NY85	4.4	5.8	B0240-11	4.5	6.0	B9596-2	3.9	5.7				Purple 5	4.4	5.9
AF879-3	4.5	5.6	E11-45	4.5	6.0	B0241-8	4.5	6.0	B9922-11	4.2	6.0				Reddale	4.7	5.9
AF1060-2	4.7	5.9	E40-10	4.6	6.0	B0242-2	4.7	6.0	F143-1(RUS)	4.3	5.9				Redsen	4.3	6.0
B0257-3	3.8	6.0	E55-27	4.1	5.8	B0257-3	3.9	6.0							B0032-35	4.5	6.0
B9792-157	4.4	5.8	E55-44	4.9	6.0	B0257-9	4.6	6.0							<i>Waller-Duncan</i>		
B9792-158	4.1	5.1	F24-3	4.2	5.8	B0329-10	4.9	5.9							(0.5) (ns)		
B9935-10	4.8	5.9	F24-12	4.6	6.0	B7592-1	4.9	6.0							Yellow-fleshed		
B9955-46	4.9	5.9	FG6-6	4.6	5.9	B9792-2B	4.3	5.9							1989 Tables 17-18		
F77087	4.8	5.8	FG6-15	4.4	5.9	B9792-8B	4.8	5.9							Clone	ACD	BS
LA 01-38	4.6	5.3	FL657*	5.0	6.0	B9792-157	4.8	5.9							Yukon Gold	5.0	6.0
NY72*	4.9	6.0				B9792-158	4.4	5.8							Red Gold	4.7	5.6
NY78	4.9	5.9				B9955-46	4.7	5.9									
WF31-4	4.5	5.9															
<i>Waller-Duncan</i>																	
LSD (0.05)	(0.5)	(0.4)				(0.4)	(ns)		(0.3)	(ns)		(1.5)	(0.2)		(0.3)	(ns)	
																(0.2)	(0.4)

After-cooking darkening (ACD) ratings based on a scale of 1 to 5; 1 = severe after-cooking darkening, 5 = no darkening. Five tubers rated per replication; four replications in each experiment.

Blackspot (BS) determinations are based on approximately ten tubers per replication. Tubers were stored at 40 F and bruised between 2/7/90 and 3/2/90. Bruised areas were peeled and evaluated two days after impact. Each tuber received a blow in each of two locations about 1 to 2 cm from the stem end. The bruising was done by dropping a 100 gram weight a distance of 30 cm. The point of impact was marked by inking the base of the weight. Ratings are based on a scale of 1 to 6 with 1 = severe discoloration and 6 = no discoloration.

* NY72 = Allegany, NY81 = Steuben, FL657 = NorWis.

Long Island Table 22. Results of non-replicated observational trial - 1990.

CLONE* >2"	Yield	Per cent		Spec Grav	Color	Tex	Shape	Tuber		Eye Depth	Other clones observed		
		HH	BC					Depth	Lat.		White	White	Russet
Katahdin	Med.	8	0	64	W	RS	R	MT-SF	S	M	B0174-11	B0239-20	B0303-30
Superior	Med.	3	10	72	W-BU	SN	R-O	MT-SF	M	M	B0174-16	B0241-8	B0309-11
BelRus	Med-Poor	20	2	72	B	HR	L-O	SF	S	S	B0174-19	B0242-31	B0316-36
B0178-30	Med.	20	20	85	W	RS	R	SF	M	M	B0174-7	B0243-20	B0324-25
B0246-4	High	0	0	72	W	SN	O	SF	M	M	B0175-21	B0245-15	B0327-9
B0246-6	Med.	10	0	75	W	SN	O	MT	S	D	B0176-24	B0257-3	B0328-7
B0310-11	Med.	0	0	79	B	MR	L-O	SF	S	S	B0179-1	B0587-9	B0329-10
B0311-12	Med.	0	0	67	B	MR	L-O	SF	S	S	B0179-18	B0613-2	B0367-6
B0316-19	Med	2	0	71	B	MR	L	MT	S	S	B0180-24	B0809-7	B0384-4
B0455-27	Med.	3	0	64	B	HR	L-O	MT	S	S	B0202-4	B0813-3	B0486-1
B0473-6	Med.	0	0		W	RS	O	MT	S	S	B0237-9	B9933-25	B0502-22
B0502-17	Med.	0	0	81	B	HR	L	MT	S	S			B0647-1
B0564-8	Med.	0	0	78	BU	SN	R	R	S	S			B0649-5
B0584-2	Med.	1	0	75	W	RS	O	M	S	D			B0653-8
B0585-5	Med.	2	1	76	W	SN	R	MT	S	D			B0730-12
B0591-5	Med.	2	0	74	W	RS	O	R	S	S			B0731-3
B0596-9	Med.	0	0	72	BU	N	R	R	S	S			B0769-5
B0602-1	Med.	0	0	71	BU	N	R	R	S	S			
B0608-5	Med-High	0	0	69	W	SN	O	MT	S	M			
B0610-2	Med.	0	0	82	W	SN	R-O	R	S	S			

* All numbered entries were not replicated. Katahdin was replicated five times, Superior four times, and BelRus six times. Ten tubers from each replication were evaluated for internal defects.
See footnotes in Table 1. for abbreviations

NEW YORK - UPSTATE

D. E. Halseth and W. L. Hymes

Program Scope

The Vegetable Crops Department, Cornell University, conducted potato variety yield trials in four counties in upstate New York in 1990 in which a total of twenty-five named and sixty-one numbered clones were evaluated. Five replicated variety yield trials were conducted at the Thompson Vegetable Research Farm at Freeville in Tompkins County on a Howard gravelly loam (Tables 1-10). Grower trials were conducted on mineral soils (not reported here) near Arkport in Steuben County and near Gainesville in Wyoming County and on muck soils near Savannah in Wayne County (Table 11). As evaluation of potato lines with golden nematode (GN) resistance is one of our program's highest priorities, a high percentage of new breeding lines in these trials have GN resistance (61%). Marketable yield, tuber quality and appearance, maturity, storage life and processing potential are among the important characteristics which are evaluated. Additional information on variety x nitrogen fertilization, storage and chipping research can be obtained from the authors.

Research Farm

All 86 entries mentioned above were evaluated in randomized complete block plots which were replicated four times at Freeville. These experiments were planted at 9" spacing on a 34" bed with 1150 lbs/A of 13-13-13 applied in bands at planting on a Howard gravelly loam soil. Seedpiece treatment was Maneb 8D-IF. Weed control consisted of Lorox DF at 3 lb/A preemergence on May 15 and Sencor DF at 0.25 lb/A postemergence on June 26. Insect control utilized applications of Ambush 2E, Guthion 2S, PBO-8 (piperonyl butoxide), Thiodan 3EC and Vydate L. Disease control of foliar pathogens used Bravo 500, Dithane F45 and Super-tin 4L. Hilling was accomplished on June 26 and vine kill used Evik 80WP 3 lbs/A + Booster 2 qt/A [kill dates on tables].

Seasonal Observations

Problems encountered in 1990 were primarily associated with very dry and hot conditions alternating with more moderate weather from late June through August. Moisture was adequate at planting in May followed by a very dry June. Misshapen, growth cracks and heat necrosis were the most common tuber defects. Yields and specific gravity were lower or about average when compared to other seasons. Early blight and scab were not a problem, but Rhizoctonia and silver scurf were observed on many lines.

Promising Entries

Replicated variety yield trial data from 1990 experiments grown at Freeville, NY, are presented in tables 1 through 10. In the early maturity trial only the clone AF875-15 had higher marketable yield than Superior. No entry was earlier than Superior in maturity, but B9955-46 and Norchip were rated equal in appearance. Coastal Chip was the highest yielder in the medium maturity trial, but it was rated the poorest in

appearance and had the highest percentage of hollow heart. The two red lines, ND2224-5R and NDT9-1068-11R, and the yellow fleshed Yukon Gold had excellent appearance scores. AF875-16 was the only line to have specific gravity values above Atlantic. Nine clones in the late maturity trial had higher marketable yield than Katahdin and four had equal or higher specific gravity readings than Atlantic. AF1060-2 and NY78 had excellent appearance ratings as well as low percentages of external defects and no internal defects. Twelve Cornell breeding lines were evaluated in a trial where none had higher dry matter than Atlantic but two had higher marketable yield than either Atlantic or Katahdin. Three enteries, FG6-15, G76-29 and G76-31 had excellent appearance and no internal defects. The russet trial screened eleven entries against Russet Burbank and five were found to produce higher marketable yield. B9922-11 continues to be the highest yielding russet clone in our trials for several seasons. Three enteries had higher specific gravity readings than Russet Burbank. BelRus and ND1538-Rus were rated best in appearance.

Grower variety trial results were obtained from three upstate locations, but only data from the thirty-two entries tested in the Wayne County muck soil trial (Table 11) are presented here. Growing conditions were unfavorable on the muck, particularly with several hot, dry periods during the growing season. Only Chieftain had marketable yield similar to Katahdin. The two red enteries, Cherry Red and Redcloud, had the highest percentage of external defects.

Table Headings
Explanation

Marketable yield in hundredweight per acre (cwt/a) was calculated from total yield less both external defects and undersize tubers (smaller than 1 7/8 inches).

Percent marketable yield represents the percentage that each entry's marketable yield is of that of a specified standard variety for that trial.

Size distribution percentage is the weight of a specific size category divided by total yield (including defects).

Specific gravity was determined by potato hydrometer.

Vine maturity ratings were on a nine point scale:

- 1 = all plants completely dead (very early maturity)
- 9 = all plants full green (very late maturity)

Tuber shape was classified using the code:

- | | | |
|------------------|-----------------|-----------------|
| 1. round | 2. mostly round | 3. rd. to obl. |
| 4. mostly oblong | 5. oblong | 6. obl. to long |
| 7. mostly long | 8. long | 9. cylindrical |

Tuber appearance was subjectively evaluated using the scale:

- 1 = extremely rough or otherwise unattractive
- 9 = very uniform and attractive

Upstate New York Table 1. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for the early maturity trial grown at Freeville, New York - 1990.

Variety/Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A	Size Distribution by Class (%) ¹					Size Distribution(%)	
			1	2	3	4	5	1-7/8 to 4 in.	2-1/2 to 4 in. Spec. Grav.
AF875-15	295	257 102	9	38	45	8	1	91	53 91
B0257-3	246	198 79	19	55	25	1	0	81	26 93
B9955-46	266	247 99	5	23	59	12	0	95	72 86
Norchip	279	243 97	10	46	41	3	0	90	44 87
Red Gold	276	221 88	18	46	32	3	1	80	34 83
Superior (std)	268	251 100	5	36	51	8	0	95	59 83
Waller-Duncan LSD (k=100)	N.S.	30							3
C.V. (%)	(7)	(8)							(3)

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 1

Vine-kill date (mowed): August 13

Harvest date: August 15

Upstate New York Table 2. Plant maturity, tuber shape and appearance, external and internal tuber defects for the early maturity trial grown at Freeville, New York - 1990.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹		External Tuber Defects (%)					Int. Tuber Defects (%) ²		
		Shape	Appear.	Total	Sun- burn	Mis- shapen	Growth Cracks	Rot	Holl. Heart	Vasc. Disc.	Int. Nec.
AF875-15	5.3	2.0	4.0	3.6	0.3	0.5	2.3	0.5	2.5	0.0	0.0
B0257-3	4.5	1.0	5.0	1.0	0.2	0.2	0.3	0.2	0.0	0.0	0.0
B9955-46	5.5	2.0	6.0	2.1	0.4	0.4	1.3	0.0	0.0	0.0	0.0
Norchip	5.5	2.0	6.0	2.7	0.4	1.3	0.4	0.6	0.0	0.0	0.0
Red Gold	4.0	2.0	5.0	0.7	0.3	0.3	0.0	0.2	0.0	0.0	0.0
Superior (std)	3.5	2.0	6.0	0.9	0.1	0.5	0.0	0.3	2.5	0.0	0.0

¹See the Table Headings Explanation section in the narrative summary of these Upstate New York trials.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 3. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for the medium maturity trial grown at Freeville, New York - 1990

Variety/Clone	Total Yield cwt/A	Marketable Yield cwt/A	percentage of std.	Size Distribution by Class (%) ¹					Size Distribution(%)		Spec. Grav.
				1	2	3	4	5	1-7/8 to 4 in.	2-1/2 to 4 in.	
AF875-16	259	234	86	9	31	55	6	0	91	60	94
Atlantic	305	280	104	7	24	60	9	0	93	69	91
B0033-23	257	219	81	12	28	49	10	1	87	59	74
B0243-18	245	216	80	9	23	59	8	1	91	68	81
B9792-158	270	234	86	12	30	47	12	0	88	58	87
Chieftain	316	280	104	10	26	55	9	0	90	64	71
Coastal Chip	329	292	108	8	16	56	18	2	90	74	86
E55-27	247	205	76	15	31	47	7	0	85	54	88
E55-44	240	219	81	9	23	55	13	0	91	68	82
E57-13	246	212	79	11	26	54	9	0	89	63	79
F77087	261	236	87	5	17	57	19	1	93	76	86
Katahdin (std)	314	270	100	7	25	54	14	0	93	68	78
Kennebec	339	284	105	7	18	51	22	3	91	73	81
Monona	254	218	81	10	32	45	13	0	90	58	74
ND2224-5R	219	183	68	15	29	49	7	0	85	56	70
NDT9-1068-11R	306	257	95	8	21	58	13	1	91	70	70
Somerset	307	272	101	5	14	48	29	4	90	77	86
Yukon Gold	237	196	73	7	16	48	25	4	89	73	89

Waller-Duncan
LSD (k=100)

41 45

2

C.V. (%) (11) (13)

(2)

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 2

Vine-kill date: August 20

Harvest date: September 4

Upstate New York Table 4. Plant maturity, tuber shape and appearance, external and internal tuber defects for the medium maturity trial grown at Freeville, New York - 1990

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹		External Tuber Defects (%)				Int. Tuber Defects (%) ²			
		Shape	Appear.	Total	Sun- burn	Mis- shapen	Growth Cracks	Rot	Holl. Heart	Vasc. Disc.	Int. Nec.
AF875-16	5.0	2.0	4.3	0.9	0.1	0.0	0.6	0.2	5.0	0.0	0.0
Atlantic	6.0	2.0	5.3	1.6	0.1	0.2	1.3	0.0	2.5	0.0	0.0
B0033-23	2.8	2.0	4.8	2.5	0.0	1.1	0.7	0.7	0.0	0.0	0.0
B0243-18	5.3	2.0	4.9	2.8	0.1	1.4	1.3	0.0	0.0	0.0	0.0
B9792-158	5.0	2.3	4.5	1.3	0.3	1.1	0.0	0.0	2.5	0.0	0.0
Chieftain	4.8	1.8	5.5	1.7	0.1	0.5	1.0	0.1	0.0	0.0	0.0
Coastal Chip	5.8	2.0	3.5	2.2	0.4	0.5	0.5	0.7	7.5	0.0	0.0
E55-27	4.3	2.0	4.8	2.1	1.5	0.7	0.0	0.0	0.0	0.0	0.0
E55-44	4.0	2.0	5.0	0.4	0.2	0.0	0.2	0.0	0.0	0.0	0.0
E57-13	5.3	2.0	6.4	2.6	0.7	0.2	0.0	1.7	2.5	0.0	0.0
F77087	6.3	3.0	4.9	2.5	1.4	0.3	0.7	0.0	0.0	0.0	0.0
Katahdin (std)	7.5	2.0	4.6	7.0	5.5	0.7	0.2	0.7	0.0	0.0	0.0
Kennebec	6.0	4.0	3.6	6.6	3.8	0.7	1.9	0.2	2.5	0.0	0.0
Monona	6.0	2.0	4.6	3.5	0.5	0.6	1.1	1.3	0.0	0.0	2.5
ND2224-5R	1.8	2.0	6.5	2.2	0.0	1.2	0.9	0.2	0.0	0.0	0.0
NDT9-1068-11R	6.8	2.0	6.5	8.0	0.7	0.4	6.9	0.0	0.0	0.0	0.0
Somerset	6.5	5.0	4.5	2.0	1.3	0.1	0.6	0.0	0.0	0.0	0.0
Yukon Gold	3.3	3.0	6.5	6.3	0.2	0.7	5.2	0.3	0.0	0.0	0.0

¹See the Table Headings Explanation section in the narrative summary of these Upstate New York trials.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 5. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for the late maturity trial grown at Freeville, New York - 1990.

Variety/Clone	Total Yield cwt/A	Marketable Yield cwt/A	percentage of std.	Size Distribution by Class (%) ¹					Size Distribution(%)		Spec. Grav.
				1	2	3	4	5	1-7/8 to 4 in.	2-1/2 to 4 in.	
AF828-5	368	314	114	5	13	49	26	8	87	74	83
AF1060-2	381	327	118	9	19	58	10	3	88	68	80
Allegany (NY72)	315	279	101	8	23	54	15	1	92	69	85
Atlantic	359	324	117	6	12	58	22	2	92	80	92
B0178-34	313	282	102	6	20	56	16	2	92	72	97
B0233-1	342	281	102	4	10	49	29	8	87	77	85
B0257-12	305	272	98	6	16	57	19	1	93	76	88
B0622-2	311	275	99	7	20	57	14	2	91	71	87
B9792-8B	332	293	106	7	19	61	13	0	93	75	95
B9955-10	240	196	71	16	28	48	8	0	84	56	92
E55-35	310	263	95	14	37	44	4	0	86	49	92
Elba	298	269	97	6	13	56	24	2	92	79	83
Katahdin (std)	328	276	100	6	13	56	20	5	89	76	81
LaBelle (LA01-38)	294	266	96	5	15	52	25	3	91	76	87
Monona	245	217	79	8	18	53	18	3	89	71	74
NY78	276	246	89	6	15	54	23	2	92	77	74
NY84	349	311	112	8	20	56	14	2	90	70	73
Steuben (NY81)	365	305	110	3	7	48	32	10	87	80	84
Waller-Duncan											
LSD (k=100)	32	31									3
C.V. (%)	(8)	(8)									(3)

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 2

Vine-kill date: August 27

Harvest date: September 13

Upstate New York Table 6. Plant maturity, tuber shape and appearance, external and internal tuber defects for the late maturity trial grown at Freeville, New York - 1990.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹		External Tuber Defects (%)				Int. Tuber Defects (%) ²			
		Shape	Appear.	Total	Sun- burn	Mis- shapen	Growth Cracks	Rot	Holl. Heart	Vasc. Disc.	Int. Nec.
AF828-5	6.5	3.0	5.0	1.6	0.8	0.7	0.1	0.0	0.0	15.0	0.0
AF1060-2	4.8	1.0	6.5	1.5	0.7	0.2	0.2	0.5	0.0	0.0	0.0
Allegany (NY72)	5.5	1.0	5.8	2.6	1.4	1.0	0.2	0.0	0.0	0.0	0.0
Atlantic	3.5	1.0	5.1	1.8	1.0	0.2	0.1	0.4	0.0	0.0	0.0
B0178-34	5.0	2.0	4.8	2.4	0.5	1.0	0.0	0.9	0.0	2.5	0.0
B0233-1	6.5	2.0	5.0	4.9	1.3	3.4	0.2	0.0	5.0	0.0	0.0
B0257-12	2.5	2.0	5.5	3.4	0.4	1.7	0.6	0.8	0.0	0.0	0.0
B0622-2	3.8	2.0	4.6	2.4	0.4	0.1	1.8	0.0	0.0	0.0	0.0
B9792-8B	6.5	2.0	4.4	5.1	1.7	2.0	0.8	0.5	2.5	5.0	0.0
B9955-10	3.8	3.0	5.1	2.2	1.1	0.2	0.6	0.3	0.0	0.0	0.0
E55-35	6.5	1.0	4.8	1.4	1.2	0.1	0.1	0.0	0.0	0.0	0.0
Elba	7.5	1.0	4.9	1.9	0.7	0.9	0.0	0.2	0.0	10.0	0.0
Katahdin (std)	5.5	2.0	4.8	3.9	3.7	0.2	0.0	0.1	0.0	0.0	0.0
LaBelle (LA01-38)	3.3	3.0	4.8	0.9	0.1	0.3	0.1	0.4	0.0	0.0	0.0
Monona	4.0	2.0	4.8	0.8	0.5	0.4	0.0	0.0	0.0	0.0	0.0
NY78	6.5	1.0	6.5	2.5	1.7	0.1	0.0	0.7	0.0	0.0	0.0
NY84	3.8	2.0	5.5	1.1	0.5	0.3	0.0	0.3	0.0	2.5	0.0
Steuben (NY81)	6.0	1.0	4.4	3.4	1.7	0.4	0.6	0.6	2.5	0.0	0.0

¹See the Table Headings Explanation section in the narrative summary of these Upstate New York trials.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 7. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for the Cornell advanced clone trial grown at Freeville, New York - 1990.

Variety/Clone	Total Yield cwt/A	Marketable Yield cwt/A	percentage of std.	Size Distribution by Class (%) ¹					Size Distribution(%)		Spec. Grav.
				1	2	3	4	5	1-7/8 to 4 in.	2-1/2 to 4 in.	
Allegany (NY72)	338	300	109	7	18	57	17	0	93	74	85
Atlantic	311	279	101	5	14	57	22	2	93	79	93
E11-45	334	297	108	9	21	53	17	1	91	70	72
E55-27	270	228	83	12	24	51	12	1	87	63	86
E55-35	303	264	96	11	23	53	13	0	89	66	89
E55-44	268	242	88	6	14	54	25	1	93	79	83
E57-13	266	222	81	10	20	49	20	1	89	69	79
F100-1	261	232	84	8	21	60	11	0	92	71	87
F24-12	297	267	97	6	13	53	24	4	90	78	76
FG6-15	258	223	81	6	10	52	27	4	89	79	75
G76-29	294	268	97	7	17	51	25	0	93	76	83
G76-31	276	250	91	6	19	58	17	0	94	75	83
G77-1	271	233	85	9	19	52	20	1	90	71	85
Katahdin (std)	308	275	100	7	19	59	15	1	92	74	77
Monona	249	223	81	7	19	51	21	1	91	73	73
Waller-Duncan LSD (k=100)	51	47									2
C.V. (%)	(11)	(12)								(2)	

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 3

Vine-kill date: August 27

Harvest date: September 27

Upstate New York Table 8. Plant maturity, tuber shape and appearance, external and internal tuber defects for the Cornell advanced clone trial grown at Freeville, New York - 1990.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹		External Tuber Defects (%)				Int. Tuber Defects (%) ²			
		Shape	Appear.	Total	Sun- burn	Mis- shapen	Growth Cracks	Rot	Holl. Heart	Vasc. Disc.	Int. Nec.
Allegany (NY72)	6.5	1.0	6.0	4.0	2.6	1.1	0.0	0.4	0.0	0.0	0.0
Atlantic	5.3	1.0	5.0	3.5	1.4	0.0	0.2	1.8	2.5	0.0	2.5
E11-45	6.5	2.0	6.4	1.8	0.9	0.2	0.1	0.6	0.0	0.0	0.0
E55-27	3.8	2.0	5.0	2.9	1.9	0.4	0.5	0.0	0.0	0.0	7.5
E55-35	7.0	1.0	6.0	1.8	1.3	0.3	0.0	0.2	0.0	0.0	2.5
E55-44	1.8	2.0	5.1	3.3	0.8	0.3	0.7	1.6	0.0	0.0	0.0
E57-13	3.0	2.0	5.8	5.6	2.3	0.0	2.4	0.8	0.0	0.0	0.0
F100-1	4.0	4.0	5.9	2.7	1.2	0.6	0.8	0.0	0.0	0.0	0.0
F24-12	5.0	2.0	5.6	0.9	0.6	0.0	0.0	0.3	0.0	0.0	0.0
FG6-15	2.8	2.0	6.9	2.5	1.6	0.2	0.6	0.0	0.0	0.0	0.0
G76-29	5.0	2.0	6.9	1.5	0.6	0.0	0.0	0.9	0.0	0.0	0.0
G76-31	1.8	2.0	6.9	3.5	2.2	0.0	0.9	0.5	0.0	0.0	0.0
G77-1	2.5	2.0	6.5	3.6	3.2	0.1	0.1	0.2	0.0	0.0	2.5
Katahdin (std)	6.3	2.0	5.4	3.0	2.2	0.1	0.6	0.2	0.0	0.0	2.5
Monona	4.0	2.0	4.9	1.8	0.2	0.8	0.8	0.0	0.0	0.0	2.5

¹See the Table Headings Explanation section in the narrative summary of these Upstate New York trials.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 9. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for the russet trial grown at Freeville, New York - 1990.

Variety/Clone	Total Yield cwt/A	Marketable Yield percentage of std.	Size Distribution by Class (%) ¹					Size Distribution(%)			Spec. Grav.	
			1	2	3	4	5	4 to 12 oz	over 8 oz	over 12 oz		
B0012-7	293	179	97	29	40	23	7	1	63	31	8	85
B0312-10	291	166	91	30	45	19	6	1	63	25	7	87
B0324-5	237	142	77	30	49	18	4	0	67	22	4	87
B0425-5	269	155	84	28	45	21	6	0	67	27	6	75
B9922-11	346	254	138	18	50	25	4	3	74	32	8	93
B9932-50	324	175	95	38	44	15	2	1	59	18	3	96
BelRus	287	168	91	39	48	12	1	0	59	13	1	91
F143-1	294	199	108	28	44	25	3	0	69	28	3	79
ND1538-RUS	334	224	122	25	44	24	6	2	68	31	8	79
NemaRus	298	185	101	29	46	19	6	1	65	25	6	77
Rus. Burbank (std)	393	184	100	43	41	11	5	0	52	16	5	88
Russet Norkotah	311	191	104	34	40	21	5	0	61	27	5	77
Waller-Duncan												
LSD (k=100)	50	60										2
C.V. (%)	(11)	(20)										(2)

¹Size classes: 1 = less than 4 oz; 2 = 4 to 8 oz; 3 = 8 to 12 oz; 4 = 12 to 16 oz; 5 = over 16 oz.

Plant date: May 3

Vine-kill date: August 27

Harvest date: September 20

Upstate New York Table 10. Plant maturity, tuber shape and appearance, external and internal tuber defects for the russet trial grown at Freeville, New York - 1990.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹		External Tuber Defects (%)					Int. Tuber Defects (%) ²			
		Shape	Appear.	Total	Sun- burn	Mis- shapen	Growth Cracks	Rot	Holl. Heart	Vasc. Disc.	Int. Nec.	
B0012-7	3.0	6.0	6.0	9.8	2.2	7.1	0.5	0.0	0.0	0.0	0.0	2.5
B0312-10	4.8	6.0	5.3	12.5	1.6	4.4	6.3	0.3	10.0	2.5	0.0	0.0
B0324-5	2.0	6.0	5.3	10.8	0.9	4.6	3.4	1.9	0.0	0.0	0.0	0.0
B0425-5	2.0	7.0	4.9	14.7	3.6	1.6	9.1	0.4	0.0	0.0	0.0	0.0
B9922-11	5.0	6.0	6.0	5.0	1.6	1.6	1.8	0.0	0.0	2.5	0.0	0.0
B9932-50	5.8	6.0	6.0	7.4	0.5	6.0	0.8	0.2	12.5	2.5	2.5	2.5
BelRus	3.5	6.0	6.6	2.4	1.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
F143-1	5.5	6.0	5.5	4.6	2.8	1.5	0.4	0.0	0.0	0.0	0.0	0.0
ND1538-RUS	2.8	6.3	6.5	6.1	1.3	3.2	1.5	0.0	0.0	0.0	0.0	0.0
NemaRus	2.3	6.0	5.5	8.4	2.1	5.8	0.5	0.0	0.0	2.5	0.0	0.0
Russet Burbank (std)	7.0	7.5	3.0	11.5	0.7	9.6	0.8	0.5	0.0	7.5	0.0	0.0
Russet Norkotah	1.5	6.0	5.4	4.5	0.4	3.3	0.0	0.7	0.0	17.5	0.0	0.0

¹See the Table Headings Explanation section in the narrative summary of these Upstate New York trials.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 11. Yield, marketable yield, percentage of yield by grade size distribution, percentage defects and specific gravity for the Wayne County muck soil variety trial grown at Savannah, New York - 1990.

Variety/Clone	Class	Total Yield		pct. of std.	Size Distribution (%) ¹					Percentage External ² Tuber Defects					Pct. Internal ³ Tuber Defects					Spec. Grav.
		cwt/A	cwt/A		1	2	3	4	5	S	K	G	R	H	V	N				
Allegany (NY72)	Whi	274	247	78	7	92	1	-	-	2	0	0	0	0	0	0	0	0	70	
Atlantic	Whi	311	281	89	6	93	1	-	-	3	0	1	0	0	0	0	0	0	82	
B0033-23	Red	242	196	62	18	82	0	-	-	0	0	0	0	0	0	0	0	0	67	
B0615-1	Red	218	175	55	18	82	0	-	-	1	0	0	2	0	0	0	0	0	67	
B0615-2	Red	227	133	42	40	60	0	-	-	1	0	1	0	0	0	0	0	0	70	
B0616-1	Red	258	220	70	14	86	0	-	-	0	0	1	0	0	0	0	0	0	69	
Castile	Whi	305	271	86	9	86	5	-	-	1	1	0	0	0	0	0	0	0	72	
Cherry Red	Red	268	213	67	8	92	0	-	-	1	0	11	1	7	0	0	0	0	77	
Chieftain	Red	335	312	99	6	94	0	-	-	1	0	0	0	0	0	0	0	0	70	
E11-45	Whi	267	231	73	12	88	0	-	-	0	1	0	0	0	0	0	0	0	68	
E55-27	Whi	240	188	59	21	79	0	-	-	1	0	0	1	0	0	0	0	0	82	
E55-35	Whi	278	246	78	11	89	0	-	-	1	0	0	0	0	0	3	0	0	81	
E55-44	Whi	209	178	56	14	86	0	-	-	0	0	0	0	0	0	0	0	0	79	
E57-13	Whi	235	185	58	20	80	0	-	-	1	0	1	0	0	0	0	0	0	72	
F24-12	Whi	325	297	94	5	94	1	-	-	1	0	0	3	0	0	0	0	0	73	
F100-1	Whi	220	194	61	11	89	0	-	-	1	0	0	0	0	0	0	0	0	84	
F82026	Whi/YF	273	221	70	18	82	0	-	-	1	0	0	0	0	0	0	0	0	80	
FG6-15	Whi	256	225	71	7	93	0	-	-	2	0	0	4	0	0	0	0	0	67	
G76-29	Whi	313	274	87	10	89	2	-	-	2	0	0	0	0	0	0	0	0	82	
G76-31	Whi	259	220	70	15	85	0	-	-	1	0	0	0	0	0	0	0	0	79	
G77-1	Whi	200	152	48	18	82	0	-	-	6	1	0	0	0	0	0	0	0	80	
Katahdin (std)	Whi	353	316	100	6	94	0	-	-	3	0	0	1	0	0	0	0	0	70	
LA12-59	Red	286	257	81	9	91	0	-	-	0	0	0	1	0	0	0	0	0	74	
Monona	Whi	246	231	73	5	92	3	-	-	1	0	0	0	3	0	0	0	0	68	

Upstate New York Table 11. - (cont.) - Yield, marketable yield, percentage of yield by grade size distribution, percent defects and specific gravity for Wayne County muck soil variety trial grown at Savannah, New York - 1990

Variety/Clone	Class	Total Yield		pct. of std.	Size Distribution (%) ¹					Percentage External ²				Pct. Internal ³				Spec. Grav.
		cwt/A	cwt/A		1	2	3	4	5	Tuber Defects				Tuber Defects				
										S	K	G	R	H	V	N	N	
ND2224-5R	Red	276	223	70	19	81	0	-	-	0	1	0	0	0	0	0	65	
NDT9-1068-11R	Red	328	287	91	7	91	2	-	-	2	1	2	0	0	0	0	67	
Red Gold	Red/YF	180	117	37	33	67	0	-	-	1	0	1	1	0	0	0	74	
Redcloud	Red	248	190	60	6	92	2	-	-	1	0	0	15	0	0	0	74	
Saginaw Gold	Whi/YF	223	177	56	13	87	0	-	-	2	2	0	4	0	0	0	77	
Yukon Gold	Whi/YF	237	207	66	7	93	0	-	-	0	0	2	3	0	0	0	74	
F143-1	Rus	237	161	51	33	58	8	1	0	0	0	0	0	0	10	0	79	
ND1538-RUS	Rus	233	139	44	38	46	12	3	0	1	1	0	0	0	0	0	71	
Waller-Duncan																		
LSD (.05)		82	79														3	
C.V. (%)		(17)	(21)														(3)	
Size categories: Whites and Reds - 1 = under 2"; 2 = 2 to 4"; 3 = over 4".																		
Russets - 1 = under 4 oz; 2 = 4 to 8 oz; 3 = 8 to 12 oz; 4 = 12 to 16 oz; 5 = over 16 oz.																		
S = Sun-green; K = Knobby/Misshapen; G = Growth Crack; R = Rot.																		
H = Hollow Heart; V = Vascular Discoloration; N = Internal Necrosis. Based on a 10-tuber sample per replication.																		

¹Size categories: Whites and Reds - 1 = under 2"; 2 = 2 to 4"; 3 = over 4".

Russets - 1 = under 4 oz; 2 = 4 to 8 oz; 3 = 8 to 12 oz; 4 = 12 to 16 oz; 5 = over 16 oz.

²S = Sun-green; K = Knobby/Misshapen; G = Growth Crack; R = Rot.

³H = Hollow Heart; V = Vascular Discoloration; N = Internal Necrosis. Based on a 10-tuber sample per replication.

Plant date: June 12

Vine-kill date: September 14

Harvest date: October 1

Fertilizer: Banded 1000 lb/A 11.1-13.0-18.9-4.2Mg-0.7Mn-0.36Zn. Sidedressed 300 lb/A 22-0-20 at hilling.

Vine-kill: Diquat 1 pt/A + non-ionic sticker.

NEW YORK

R.L. Plaisted, B.B. Brodie, D.E. Halseth, S.S. Slack and W.M. Tingey

Early Generations: The crossing program produced 175 hybrid combinations. Seventy-three have chipping potential. Five are russet crosses and two are red crosses. Sixty-eight are trichome population crosses. The remainder are other disease resistant crosses.

Seeds produced in 1988 produced 68,000 tubers. Approximately 52,000 have chipping potential. Another 1,400 are red. There were 3,000 trichome seedling tubers and 11,000 neotuberosum.

The seedling hill population consisted of 56,000 with chip potential, 3,600 russets, 600 reds, and 7,000 trichome hills. There were 14,600 single four-cut size tubers selected at harvest. These were reduced to 3,994 by washing and grading for surface defects, and by discarding those with internal defects and dark chip color based on test tape after 48° storage. Only 26 russet and 28 red single hill selections were made.

There were 5,826 second year observation-seed plots planted with the four-cut sized tubers selected in 1987. All of these crosses had chipping potential. At harvest 1,223 were saved. These were screened for SG and 832 were saved. A four-cut sized tuber was stored at 48° until February when it was evaluated for reducing sugars and internal defects. Two pieces were planted for virus indexing in the greenhouse and two pieces were evaluated for resistance to the golden nematode. Three hundred forty seven survived these tests.

The 347 third year observation plots with chipping potential produced 150 selections. Eighty-three were discarded later based on specific gravity and chip color.

Intermediate Generations: The fourth year cohort of selections started with 63 clones. After evaluation for yield, specific gravity, appearance, chip color, and susceptibility to scab, 11 were saved.

The fifth year selections (H generation) started with 28 clones. Nine survived the screening processes.

There were three clones in the sixth year of evaluation. Only one has been saved. G76-29 has potential for both tablestock and chipping. It is resistant to the golden nematode.

Advanced Generations: A summary of the performance of the ten most advanced clones is as follows:

NY78 = A938 = M348-45 x Katahdin (1977). Late season tablestock. Marginal yield, poorer in 1990 than 1989. Somewhat smaller size distribution than Katahdin. Very few pickouts and internal defects. Attractive shape and bright skin. More resistant to scab than Katahdin. Low specific gravity. Poor chip color. Possible problem with uneven stands. Tubers tend to hang to vine at harvest. Good resistance to Verticillium wilt. Resistant to golden nematode.

NY79 - A73-1 = 5377-10 x Elba (1977). Early tablestock, though scattered reports of good chip color from the field. Early yields equal to Superior. Subject to growth cracks and hollow heart, especially on Long Island. Very low specific gravity. Scurfy skin. Good scab resistance. Resistant to golden nematode.

NY84 = D146-11 = Rosa x NY66 (1980). Midseason tablestock. Very good yield. Early sizing. Rapid emergence. Vigorous growth. Tuber size like Katahdin. Very few pickouts and internal defects. Attractive shape. Very good scab resistance. Low specific gravity. Poor chip color from storage but acceptable from the field. Long tuber dormancy. Enlarged lenticels in 1990. Resistant to golden nematode.

NYE11-45 = Rosa x Q155-3 (1981). Mid to late season tablestock. Very high yield. Small to medium size tubers. Very few pickouts and internal defects. Very attractive shape and bright skin. Resistance to scab similar to Norchip. Specific gravity like Monona. Good chip color from field, 48°, 45° + reconditioning. Resistant to golden nematode.

NYE55-27 = Allegany x Atlantic (1981). Midseason chipstock. Rapid emergence. Acceptable yields. Medium tuber size. Pickouts similar to check varieties. Scurfy skin. Only slightly more resistant to scab than Katahdin. Chips well from the field, but not consistent from 48° storage. Specific gravity close to Atlantic. Good resistance to Verticillium wilt. Resistant to golden nematode.

E55-35 = Allegany x Atlantic (1981). Late season chipstock. Acceptable marketable yield, but very small size. Few pickouts. Some net and internal necrosis. Excellent scab resistance. Good chip color. Very high specific gravity. Resistant to golden nematode.

NYE55-44 = Allegany x Atlantic (1981). Early table and chipstock. Acceptable yields for an early harvest. Pickouts about like check varieties. Attractive shape. Scurfy skin. Scab susceptibility like Katahdin. Specific gravity like Norchip. Good chip color from the field. Rapid emergence and plant vigor. Resistant to golden nematode. Susceptible to early blight.

NYE57-13 = Allegany x Q155-3 (1981). Midseason table and chipstock. Yield comparable to Monona. Medium size tubers. Few pickouts. Prominent lenticels. Small percentage of hollow heart. Very attractive tuber shape. Bright skin. Good scab resistance. Specific gravity between Katahdin and Norchip. Excellent chip color from field, 48° and 45° + reconditioning. GN susceptible. Long tuber dormancy.

NY86 = NYFG6-15 = Allegany x NY73 (1983). Midseason tablestock. Acceptable yield and size. Very attractive, oblong shape. Few pickouts and internal defects. Scab susceptibility between Norchip and Katahdin. Specific gravity like Katahdin. Poor chip color from storage. Long tuber dormancy. Resistant to golden nematode.

NY87 = NYF24-12 = Monona x Allegany (1982). Midseason chip and tablestock. Very high yields. Early sizing. Acceptable tuber shape, somewhat deep apical eye. Bright skin. Large tuber size. A small percentage of hollow heart. Scab resistance between Norchip and Katahdin. Good chip color from field, 48° and 45° + reconditioning. Specific gravity between Katahdin and Norchip. Resistant to golden nematode. Long tuber dormancy.

Germplasm Development: The populations being developed are the following:

1. Resistance to Colorado potato beetle based on trichome traits from S. berthaultii.
2. Resistance to Globodera pallida based on resistance developed at CIP.
3. Neotuberosum with emphasis on chipping quality and resistance to PVX and PVY.
4. Resistance to root knot nematodes based on neotuberosum.
5. Resistance to root lesion nematodes based on resistance found in the Globodera pallida population.

NORTH CAROLINA

M.J. Wannamaker and W.W. Collins

Breeding Program:

Efforts continue to develop varieties for North Carolina production areas. Traits of interest include early maturity, high yield, heat tolerance, good chip color, high dry matter, and resistance to selected diseases that include PVX, PVY, early blight, and Erwinia soft rot. Preliminary evaluations for tuber type and shape were made among 7323 single hills representing 51 families at the Mountain Horticultural Crops Research Station (MHCRS) in Fletcher, N.C. Of these, 221 were selected for evaluation in subsequent years. An additional 1280 first generation tubers were screened for early blight resistance in the field and 40 were selected with excellent early blight resistance, tuber type, and appearance. Intermediate testing was conducted at MHCRS and at the Tidewater Research Station (TRS) in Plymouth, N.C. Advanced selections in the round white, red, and russet potato categories from the North Carolina program, USDA, and other potato programs were tested in variety trials at TRS and at three on-farm locations in eastern North Carolina. Tests were planted March 7 - March 26 using a randomized complete block design with four replications. Fertilization, pest, and weed control practices were in compliance with those for commercial growers in the area. Plots were harvested 95-103 days after planting (DAP); the russet trial was harvested 116 DAP. Results are presented in North Carolina Tables 1-6.

Several russet clones yielded well and had good quality, demonstrating that russets can be developed for the Southeast despite their need for a longer growing season and intolerance to fluctuating environmental conditions. Red varieties, Chieftain and Reddale, yielded well and had good color and appearance; however, Norland and Red Gold did not perform well due to low yields or poor skin color. Yukon Gold is also a promising variety for the fresh market industry. Within the round white chipping category, Coastal Chip and breeding lines from the USDA and Maine programs exceeded or compared with the performance of Atlantic. Two advanced North Carolina clones, NC012-18 and NC012-19, were entered in the Northeast 107 Regional Project for upcoming regional testing.

Specific tetraploid studies conducted in 1990 included an inter-regional study with Virginia, New Jersey, and Washington to study the influence of preplanting temperature stress on the development of internal heat necrosis in Atlantic potato. Also, location, year, and harvest effects on varietal susceptibility to internal heat necrosis were evaluated to develop a field screening procedure. Crosses were completed between adapted tetraploid material and high dry matter diploid clones for the purpose of evaluating general and specific combining ability and selecting high dry matter tetraploid clones.

Adaptation and
Diploid Breeding:

Evaluation and maintenance of the adapted PHU-STN population was continued at the MHCRC. Four separate and specific populations previously selected for 1) high dry matter, 2) resistance to Alternaria solani, 3) resistance to Erwinia, and 4) heat tolerance were genetically recombined into one population. This population is now being simultaneously evaluated for all four traits. In addition, studies were begun to evaluate and increase the level of resistance to PVY in the recombined population. These studies involve the selection of trichomes type A and B for vector resistance as well as selection for genetic resistance to the virus itself. Studies continued in 1990 included 1) relationship of high dry matter and resistance to Erwinia and 2) study of the genotypic, phenotypic, and environmental correlation between maturity and early blight (Alternaria) resistance.

NORTH CAROLINA Table 1. Potato Variety Trial at Bright Farm, Pasquotank County.¹

VARIETY/ CLONE	TOTAL YIELD CWT/A	MARKETABLE YIELD ²		APPEARANCE ²	SPECIFIC GRAVITY	CHIP COLOR ³		HOLLOW ⁴ HEART	HEAT NECROSIS ⁴	ROTS ⁴
		CWT/A	% ATLANTIC			1	2			
B9792-158	404.6	376.6	111	6	1.075	2	5	0	0	1
B0178-34	371.9	357.8	105	6	1.090	1	3	0	0	0
COASTAL CHIP	365.2	349.6	103	7	1.099	3	3	2	0	0
B0202-4	362.4	343.1	101	8	1.072	2	3	1	0	0
ATLANTIC	359.4	340.6	100	8	1.087	1	6	1	0	0
SUNRISE	354.7	334.9	98	7	1.069	3	3	0	0	0
STEUBEN	350.6	330.0	97	6	1.077	3	7	0	0	0
B0174-16	341.6	318.5	94	7	1.088	4	6	0	0	0
B0237-9	334.9	320.1	94	9	1.075	3	3	2	0	0
KANONA	326.5	310.3	91	8	1.076	1	2	1	0	0
AF875-15	322.9	311.1	91	8	1.075	2	3	0	0	0
NC004-1	317.3	266.1	78	6	1.073	5	4	1	0	0
B0172-12	312.4	287.4	84	6	1.077	3	3	3	0	0
B0257-3	309.3	286.6	84	9	1.090	2	5	0	2	0
AF845-11	305.6	292.3	86	6	1.076	3	5	0	0	0
SUPERIOR	301.6	289.8	85	7	1.072	2	4	0	0	0
AF875-17	297.2	275.9	81	8	1.081	2	3	0	0	0
NC012-18	296.2	278.4	82	7	1.080	1	5	1	0	0
F100-1	288.9	262.0	77	6	1.086	1	3	2	0	0
AF879-3	284.3	253.0	74	7	1.088	1	4	0	0	0
NC013-10	281.5	237.4	70	5	1.072	5	7	0	0	0
B9935-10	276.4	260.4	76	7	1.073	3	4	0	0	0
NORCHIP	266.1	234.2	69	7	1.079	3	4	0	0	0
AF875-16	240.7	226.0	66	7	1.098	1	3	0	0	0
LSD (.05)	43.8	44.5								
CV	9.7	10.6								
MEAN	319.7	297.6								

¹ Trial planted 3/9/90, harvested 6/20/90.

² Appearance: 1= very poor, 3= poor, 5= fair, 7= good, 9= excellent.

³ Chip color supplied by Wise Foods: 6/22/90 & 6/27/90. 1= v.light, 5= acceptable, 9= v.dark.

⁴ Number of tubers out of 40 (10/replication) with internal disorder.

NORTH CAROLINA Table 2. Potato Variety Trial at Cooper Farm, Tyrrell County.¹

VARIETY/ CLONE	TOTAL YIELD CWT/A	MARKETABLE YIELD CWT/A	YIELD % ATLANTIC	APPEARANCE ²	SPECIFIC GRAVITY	CHIP COLOR ³		HOLLOW ⁴ HEART	HEAT NECROSIS ⁴	ROTS ⁴
						1	2			
AF875-16	335.1	316.0	113	8	1.092	2	2	2	2	0
B0179-17	324.7	303.8	109	8	1.089	6	5	3	0	0
B9988-7	322.6	308.7	111	8	1.083	4	6	3	0	0
B0176-24	319.3	307.8	110	8	1.087	2	8	6	0	0
B0256-1	317.9	308.7	111	8	1.087	6	8	9	3	0
AF879-3	317.4	301.3	108	8	1.090	1	4	2	1	0
AF875-17	314.9	296.4	106	7	1.093	4	7	0	0	0
COASTAL CHIP	313.4	295.6	106	7	1.072	5	7	0	0	0
SUNRISE	312.9	298.0	107	7	1.080	4	4	4	0	0
AF845-11	311.1	295.6	106	8	1.107	2	7	5	0	0
STEUBEN	309.5	296.4	106	8	1.088	6	8	5	0	0
SUPERIOR	307.7	287.4	103	8	1.080	3	5	4	0	0
B9792-158	306.9	291.5	104	8	1.085	2	6	7	2	0
F100-1	306.5	289.0	104	8	1.089	1	5	0	0	0
AF875-15	305.9	287.4	103	8	1.090	2	4	3	0	1
NC013-10	305.2	293.9	105	7	1.085	5	8	7	0	0
B0241-8	300.0	277.5	99	7	1.075	3	6	1	2	0
ATLANTIC	299.0	279.2	100	8	1.087	3	7	6	2	0
B0172-22	289.4	268.6	96	7	1.088	1	4	1	0	0
NC004-1	289.2	273.5	98	7	1.093	6	6	3	0	0
NC012-18	271.8	257.1	92	8	1.085	2	3	4	1	0
KANONA	269.0	257.9	92	7	1.080	2	5	1	0	0
B0257-12	267.6	257.9	92	8	1.090	3	7	5	0	0
NORCHIP	263.8	252.2	90	8	1.087	2	5	1	1	0
LSD (.05)	66.1	65.0								
CV	15.4	16.0								
MEAN	303.4	287.6								

¹ Trial planted 3/16/90, harvested 6/19/90.² Appearance: 1= v. poor, 3= poor, 5= fair, 7= good, 9= excellent.³ Chip color supplied by Wise Foods: 6/21/90 & 6/26/90. 1= v.light, 5= acceptable, 9= v.dark.⁴ Number of tubers out of 40 (10/replication) with internal disorder.

NORTH CAROLINA Table 3. Potato Variety Trial at McCotter Farm, Pamlico County.¹

VARIETY/ CLONE	TOTAL YIELD CWT/A	MARKETABLE YIELD		APPEARANCE ²	SPECIFIC GRAVITY	CHIP COLOR ³			HOLLOW ⁴ HEART	HEAT NECROSIS ⁴	ROTS ⁴	
		CWT/A	% ATLANTIC			1	2	3				MEAN
COASTAL CHIP	422.5	401.2	105	8	1.077	2	4	4	3.3	10	1	0
B9792-158	420.5	372.5	98	6	1.071	3	4	5	4.0	3	0	0
ATLANTIC	404.3	381.5	100	7	1.084	7	7	8	7.3	5	5	0
SUNRISE	396.0	366.8	96	6	1.064	2	3	5	3.3	0	0	0
KANONA	395.6	362.7	95	6	1.075	1	2	3	2.0	0	0	0
B0178-30	394.8	360.2	94	7	1.082	1	3	5	3.0	11	0	0
STEUBEN	381.9	352.9	92	6	1.067	6	6	8	6.7	5	0	0
NC004-1	381.5	326.7	86	6	1.070	5	6	6	5.7	11	1	0
B0233-1	376.8	355.3	93	7	1.066	5	6	8	6.3	7	0	0
B0566-5	373.5	302.1	79	7	1.072	6	6	7	6.3	1	10	0
SUPERIOR	362.9	339.8	89	6	1.075	4	6	7	5.7	0	0	0
AF875-15	362.2	345.5	91	7	1.084	2	3	3	2.7	1	0	0
NC012-18	358.4	350.4	92	8	1.084	4	4	6	4.7	17	0	0
B0238-4	354.5	325.9	85	7	1.069	5	3	7	5.0	4	14	0
B0257-9	352.2	329.9	86	6	1.079	4	5	7	5.3	4	5	0
NC013-10	350.0	311.9	82	6	1.063	6	7	8	7.0	13	2	0
AF845-11	346.7	330.0	86	7	1.072	1	6	6	4.3	0	0	0
NORCHIP	346.2	311.1	82	6	1.079	3	4	6	4.3	0	2	0
F100-1	342.7	320.1	84	7	1.082	3	4	3	3.3	6	4	0
AF875-16	332.6	318.5	83	7	1.086	2	3	3	2.7	0	0	0
AF879-3	332.3	311.9	82	7	1.087	4	4	5	4.3	0	0	0
AF875-17	321.6	301.3	79	7	1.079	4	4	6	4.7	1	1	0
B0174-11	303.6	283.3	74	8	1.079	3	3	5	3.7	1	1	0
B0200-36	301.1	253.8	67	7	1.079	1	3	4	2.7	1	1	0
LSD (.05)	62.0	60.1										
CV	12.1	12.8										
MEAN	363.1	334.0										

¹ Trial planted 3/7/90, harvested 6/18/90.

² Appearance: 1= very poor, 3= poor, 5= fair, 7= good, 9= excellent.

³ Chip color supplied by Wise Foods: 6/21/90, 6/26/90, & 7/3/90.

⁴ Number of tubers out of 40 (10/replication) with internal disorder.

1= v.light, 5= acceptable, 9= v.dark.

NORTH CAROLINA Table 4. Northeast 107 Regional Trial at Tidewater Research Station, Plymouth, N.C.¹

VARIETY/ CLONE	TOTAL YIELD CWT/A	MARKETABLE YIELD CWT/A	% ATLANTIC	APPEARANCE ²	SPECIFIC GRAVITY	CHIP COLOR ³	HOLLOW ⁴ HEART	HEAT NECROSIS ⁴	ROTS ⁴
CHIEFTAIN	316.1	262.0	127	7	1.065	4	0	3	0
AF1060-2	315.9	266.9	130	8	1.069	4	0	0	0
STEUBEN	301.8	281.6	137	8	1.072	5	0	0	0
AF875-15	300.3	222.7	108	7	1.084	2	0	0	0
B9792-158	297.9	238.2	116	7	1.070	3	0	0	0
REDDALE	291.2	271.8	132	7	1.064	7	0	0	1
RED GOLD	268.1	199.0	97	5	1.069	4	0	0	0
73C26-1 ⁵	258.2	218.6	106	7	1.072	5	0	2	0
B0241-8	257.3	210.4	102	6	1.074	3	1	0	0
NY84	252.2	220.2	107	5	1.065	4	0	0	0
KENNEBEC	250.2	208.0	101	7	1.073	3	0	0	0
KATAHDIN	250.0	219.4	107	7	1.068	5	0	1	0
NORCHIP	248.9	173.6	84	6	1.073	2	0	1	0
ATLANTIC	247.2	205.5	100	8	1.079	2	0	0	0
B0256-1	246.6	212.0	103	8	1.085	3	0	0	0
AF828-5	241.0	209.6	102	7	1.072	2	0	0	0
YUKON GOLD	237.4	212.0	103	7	1.075	4	0	0	0
SUPERIOR	234.5	198.2	96	7	1.070	3	0	0	0
B0257-3	234.0	183.4	89	7	1.078	3	0	0	0
AF875-16	233.2	193.2	94	8	1.086	1	0	0	0
NORLAND	226.3	191.6	93	7	1.057	4	1	0	0
F77087	224.7	196.5	96	6	1.075	3	0	0	0
E57-13	205.8	146.6	71	7	1.078	2	0	0	0
R BURBANK	205.5	60.6	29	1	1.074	5	0	5	0
LSD (.05)	44.3	42.6							
CV	12.3	14.6							
MEAN	254.3	206.2							

¹ Trial planted 3/26/90, harvested 6/28/90.² Appearance: 1= v.poor, 3= poor, 5= fair, 7= good, 9= excellent.³ Chip color supplied by Wise Foods: 7/3/90. 1= v.light, 5= acceptable, 9= v.dark.⁴ Number of tubers out of 40 (10/replication) with internal disorder.⁵ The NC clone 73C26-1 has been redesignated NC004-1.

NORTH CAROLINA Table 5. Round White Augmented Trial at Tidewater Research Station, Plymouth, N.C.¹

VARIETY/ CLONE	TOTAL YIELD CWT/A	MARKETABLE YIELD		APPEARANCE ²	SPECIFIC GRAVITY	CHIP COLOR ³			HOLLOW ⁴ HEART	HEAT NECROSIS ⁴	ROTS ⁴
		CWT/A	% ATLANTIC			1	2	3			
Replicated Entries											
B0608-7	294.4	219.4	92	7	1.072	1	1	0	0.7	0	0
SUNRISE	294.3	258.7	109	8	1.074	1	0	0	0.3	0	0
B0610-6	292.0	257.1	108	7	1.081	0	0	0	0.0	0	0
NC013-10	287.1	259.5	109	7	1.080	1	1	1	1.0	0	0
ATLANTIC	271.7	238.3	100	8	1.092	0	0	0	0.0	0	0
NC013-22	270.8	221.9	93	7	1.073	0	0	0	0.0	1	0
SUPERIOR	269.9	231.7	97	7	1.074	1	0	0	0.3	0	0
NORCHIP	266.1	213.7	90	7	1.084	0	0	1	0.3	0	2
NC002-1	262.8	216.2	91	6	1.068	0	2	0	0.7	0	1
NC011-1	262.0	235.8	99	7	1.073	0	0	0	0.0	0	1
NC017-3	260.7	230.1	97	7	1.071	1	3	0	1.3	0	0
FL 657	259.1	231.7	97	7	1.074	0	0	0	0.0	2	0
NC012-18	250.2	227.6	96	7	1.087	0	0	0	0.0	1	1
B0585-5	243.8	212.9	89	7	1.081	0	0	0	0.0	2	1
B9947-N24	238.3	214.5	90	6	1.075	1	0	0	0.3	0	0
B0675-N2	237.8	200.6	84	7	1.087	0	0	0	0.0	0	0
B0584-2	236.3	199.0	83	7	1.077	0	0	0	0.0	0	0
LSD (.05)	35.6	35.4									
CV	9.5	10.9									
MEAN	264.5	227.6									
Non-replicated Entries											
NC018-3	328.8	281.7	118	6	1.082	0	0	0	0.0	0	0
B0613-3	317.0	288.2	121	8	1.076	0	0	0	0.0	0	0
B0613-2	317.0	288.2	121	8	1.075	0	0	0	0.0	0	0
B0602-1	316.4	248.9	104	8	1.074	1	0	0	0.3	0	0
B0246-6	290.8	262.0	110	6	1.084	0	0	0	0.0	0	0

(Continued)

NORTH CAROLINA Table 5. Round White Augmented Trial at Tidewater Research Station, Plymouth, N.C.¹. (Contd.)

VARIETY/ CLONE	TOTAL YIELD CWT/A	MARKETABLE YIELD		APPEARANCE ²	SPECIFIC GRAVITY	CHIP COLOR ³			HOLLOW ⁴ HEART	HEAT NECROSIS ⁴	ROTS ⁴
		CWT/A	% ATLANTIC			1	2	3			
Non-Replicated Entries (Contd.)											
B0405-6	275.1	235.8	99	8	1.072	0	0	0	0.0	0	0
B0608-5	273.8	232.5	98	8	1.070	0	1	0	0.3	0	0
NC012-19	267.9	239.1	100	7	1.085	0	1	0	0.3	0	0
B0581-N1	266.6	216.2	91	7	1.071	0	0	0	0.0	0	0
B0242-31	264.6	219.4	92	8	1.073	0	0	0	0.0	0	0
NC014-1	264.0	239.1	100	8	1.068	0	0	0	0.0	0	0
B0590-1	263.3	222.7	93	6	1.082	1	0	0	0.3	0	0
B0596-9	261.4	222.7	93	7	1.079	0	0	0	0.0	0	0
B0245-15	259.4	232.5	98	6	1.079	0	0	0	0.0	0	0
B0600-6	254.8	186.7	78	6	1.084	0	0	0	0.0	0	0
B0243-7	252.2	190.0	80	6	1.076	1	0	0	0.3	0	0
B9933-25	245.0	190.0	80	7	1.088	0	0	0	0.0	0	0
B0754-N1	243.7	183.4	77	7	1.089	0	0	0	0.0	0	0
B0588-2	243.7	196.5	82	7	1.087	0	0	0	0.0	3	0
NC009-8	230.6	209.6	88	7	1.081	0	0	0	0.0	0	0
AF1433-5	225.3	203.1	85	7	1.099	0	0	0	0.0	0	0
NC016-3	224.7	180.1	76	7	1.089	2	1	0	1.0	0	0
B0585-N1	200.4	176.9	74	8	1.081	0	0	0	0.0	0	0
B0586-3	186.0	157.2	66	7	1.085	0	0	0	0.0	0	0
NC018-1	178.2	150.7	63	7	1.076	0	0	0	0.0	0	0
B0635-6	173.6	150.7	63	7	1.089	0	1	0	0.3	0	0
B0717-N1	153.9	131.0	55	7	1.075	1	0	0	0.3	2	0
B0726-N2	0.0	0.0	0								

¹ Trial planted 3/26/90, harvested 6/28/90.

² Appearance: 1= v.poor, 3= poor, 5= fair, 7= good, 9= excellent.

³ Chip color indirectly measured using Snack Food sugar test strips. A mean of >2 constitutes an undesirable chip color.

⁴ Number of tubers out of 40 (10/replication) with internal disorder.

NORTH CAROLINA Table 6. Russet Augmented Trial At Tidewater Research Station, Plymouth, N.C.¹

VARIETY/ CLONE	TOTAL YIELD CWT/A	MARKETABLE YIELD CWT/A	% RUSSET NORKOTAH	APPEARANCE ²	SPECIFIC GRAVITY	TUBER ³ COLOR	HOLLOW ⁴ HEART	HEAT NECROSIS ⁴	ROTS ⁴
<u>Replicated Entries</u>									
B9922-11	275.1	231.2	134	9.0	1.068	3.0	0	5	0
NEMARUS	267.9	190.6	111	8.5	1.067	2.8	0	0	0
R NORKOTAH	267.6	171.9	100	7.5	1.063	2.8	0	0	0
NORKING R	197.2	117.9	69	7.7	1.066	3.0	0	1	0
BELRUS	165.7	126.4	73	7.7	1.071	3.0	0	4	0
C RUSSET	149.8	84.5	49	7.7	1.059	2.0	0	1	0
LSD (.05)	78.2	74.0							
CV	23.5	31.9							
MEAN	220.6	153.8							
<u>Non-Replicated Entries</u>									
B0184-18	378.6	319.7	186	9.0	1.071	1.0	0	0	0
B0045-6	370.8	317.0	184	9.0	1.070	3.0	0	0	0
B0455-27	321.0	238.4	139	9.0	1.071	3.0	0	0	0
B0220-14	311.8	275.1	160	8.0	1.073	3.0	0	0	0
B0310-11	299.4	243.7	142	9.0	1.073	3.0	0	0	0
B0329-10	239.1	150.7	88	8.0	1.072	1.0	0	0	0
AF1392-11	238.4	116.6	68	8.0	1.076	3.0	0	0	0
B0479-3	226.6	154.6	90	8.0	1.075	3.0	0	0	0
B0324-25	207.6	163.8	95	8.0	1.072	3.0	0	0	0
B0324-5	206.3	174.2	101	8.0	1.070	3.0	0	0	0
B0653-8	199.1	124.5	72	8.0	1.073	1.0	0	0	0
B0338-5	182.1	144.1	84	8.0	1.069	2.0	0	8	0
B0311-12	178.2	110.0	64	9.0	1.072	3.0	0	0	0

(Continued)

NORTH CAROLINA Table 6. Russet Augmented Trial At Tidewater Research Station, Plymouth, N.C.¹ (Continued)

VARIETY/ CLONE	TOTAL YIELD CWT/A	MARKETABLE YIELD		APPEARANCE ²	SPECIFIC GRAVITY	TUBER ³ COLOR	HOLLOW ⁴ HEART	HEAT NECROSIS ⁴	ROTS ⁴
		CWT/A	% RUSSET NORKOTAH						
Non-Replicated Entries (contd.)									
B0524-9	174.9	124.5	72	8.0	1.079	1.0	0	0	0
B0312-10	167.0	111.4	65	7.0	1.071	3.0	0	0	0
AF1370-13	165.7	76.0	44	8.0	1.075	3.0	0	0	0
B0502-17	135.6	89.1	52	9.0	1.065	2.0	0	0	0
B0649-5	129.7	59.0	34	8.0	1.076	2.0	0	0	0
B0367-6	113.3	57.6	33	8.0	1.073	2.0	0	0	0
B0647-1	38.0	10.5	6	6.0		3.0	0	2	0

¹ Trial planted 3/26/90, harvested 7/19/90.

² Appearance: 1= v.poor, 3= poor, 5= fair, 7= good, 9= excellent.

³ Tuber color: 1= lightly russetted, 2= medium russetted, 3= heavily russetted.

⁴ Number of tubers out of 40 (10/replication) with internal disorder.

1990 NORTH DAKOTA POTATO BREEDING REPORT

R. H. Johansen, Bryce Farnsworth and Dean Peterson

Crossing and Seedling Production

In 1990, 362 crosses were made in the greenhouse during the winter and spring and 51,352 seedlings were grown in the greenhouse. The majority of the seedlings grown in the greenhouse were produced in artificial media.

In the field at the Langdon Ag Experiment Station, 46,012 seedling tubers from the 1989 greenhouse crop were grown. The seedlings were planted on May 8 and 9th and harvested on September 17 and 18th. A carry over in the soil of the herbicide Glean destroyed approximately one fourth of the seedling crop. The seedlings were planted on rented land and the renter failed to notify the superintendent at the Langdon Ag Experiment Station that Glean had previously been applied. Rainfall was fairly adequate through most of the season; however, periods of drought did occur.

Advanced Selections

At Grand Forks and Absaraka, 716 second year selections were planted and 148 were saved in the fall. Of the older material, 143 third year selections were planted and 39 were saved at harvest. From the 4th year selections, 169 were planted and 109 saved at harvest. The Grand Forks plots were planted on May 18 and harvested on September 4 and 5th. The Absaraka plot was planted on May 18 and harvested on September 10th. Casselton plots were planted on May 23 and 24th and harvested on September 26th.

Promising Selections

Several selections looked promising during the 1990 season. They were ND1538-1Russ, ND671-4Russ, ND2471-8, ND2008-2, ND2225-1R, ND1995-1, ND1562-4R, ND2224-5R and ND2417-6. Both ND1538-1Russ and ND671-4Russ look promising enough that they both will possibly be named within the near future. ND1538-1Russ has exceptionally good table quality, both for boiling and baking, and has very good resistance to hollow heart. This russet selection also has some resistance to Verticillium wilt, excellent resistance to scab and some tolerance to drought. ND671-4Russ is a russet selection that seems to do well as a french fry variety. ND671-4Russ has been around for some time as the cross was made in 1977 between Wash. 330 x ND9567-2Russ. The cross resulting in ND1538-1Russ was made in 1980 between ND450-3Russ and Lemhi.

All of the reds like ND1562-4R, ND2224-5R, ND2225-1R and ND1871-3R have exceptionally good dark red color. Line ND2471-8, a cross between

Yankee Chipper and ND860-2 made in 1984, is a cold chipper and has high yield and total solids. ND2417-6, also a cold chipper, is from a cross between Norchip and ND860-2. ND1995-1 and ND2008-2 both performed fairly well during the 1990 season.

Cultivar and Selection Trial

Trials at Grand Forks, Park River and Williston were again planted in 1990. The Grand Forks and Park River trial had 31 entries, while the Williston trial had 11 entries. The trials were again planted in a randomized block of 4 replications and 25 hills (ND Table 1).

The Grand Forks trial was planted on May 15 and harvested on September 24. Roger Hanson was in charge of this trial, which was planted on the Potato Research Farm. The Park River trial, under the supervision of County Agent Wayne Grinde was planted on May 8 and harvested on September 6th. Superintendent Ernie French was in charge of the Williston trial. The North Central Regional Trial and the advanced selection trial called the extra trial were again planted at Grand Forks. Planting, harvest dates and other information concerning the trials are again found in ND Table 1.

We again experienced a drought in 1990. This was the third consecutive year a drought has occurred in North Dakota. Average yields at Grand Forks were 102 cwt per acre while the Park River trial averaged 119 cwt per acre (ND Table 2).

The highest yielding entries were NDT-9-1068-11R, Red Pontiac and ND1618-13R. For the past several years these entries have been the highest yielding entries in trial. Other high yielding entries were ND1562-4R, ND2264-7, ND1538-1Russ and ND2471-8. Although the type and shape of Gemchip was good, it did not yield as well as Norchip. Frontier and Russet Norkotah were fairly low in yield, however, they were both higher than Russet Burbank, which was the lowest in yield among the 31 entries in trial. In general, Frontier did not look good in trial.

When comparing the annual performance of russets in trial, ND1538-1Russ was probably the most outstanding. This selection outyielded all of the russet selections.

Cultivar Trial

Probably the most outstanding white was ND2471-8, which has high yield, very high total solids and is a cold chipper. This selection is from a cross between Yankee Chipper and ND860-2. Other whites that looked good in trial were ND2417-6, ND2008-2 and ND1995-1. ND2008-2, a white chipping selection that has been increased and tested for several years, appears

to be quite susceptible to hollow heart and storage rots. ND986-9, ND860-2 and ND2471-8 were all higher than Norchip in total solids.

Three lines, ND1342-18, ND3059-1Russ and ND3166-2, were the highest yielding in the advanced selection trial (ND Table 3). ND3059-1Russ is a russet that has shown high yield in other trials; however, the type and shape of this selection is only fair. ND1342-18 is a good chipping white selection. Several of the most outstanding selections in this trial will be in the statewide trial in 1991.

Red Pontiac was the highest yielding entry in the Williston trial (ND Table 4). Severe drought at Williston again caused the yields to be low (average yield 47 cwt per acre).

Processing Tests - Chipping

Chipping tests were again conducted during January and February, 1990 on varieties and selections grown in the 1989 potato variety trials at Park River and Grand Forks (ND Table 5). Samples were chipped out of storage at 40° F and then chipped after reconditioning for two and four weeks at 65° F. Percent yield of chips was also determined on a 100 gram sample of fresh weight chips.

Several of the advanced selections that have ND860-2 in their pedigree chipped fairly well out of cold storage (40° F). ND860-2, which is a selection that has Solanum phureja in its pedigree, has been used both commercially and for research as a cold chipper. The selections that appeared the best as cold chippers were ND1725-4, ND1995-1, ND1725-13, ND2013-4, ND2031-6, ND2471-8 and ND2642-8. Although not all of these selections chipped as well as ND860-2 out of cold storage, there was some indications that they had inherited some of the cold chipping characteristics from ND860-2 and chipped fairly well out of 43°F storage. ND2471-8, a cross between Yankee Chipper and ND860-2, has to be singled out as the best chipper. This selection not only has outstanding chipping characteristics, but it also has good yield and solids.

Chipping tests were also done on all of the whites and some of the russets grown in the observation trial at Grand Forks during 1989. This chipping test is done by the Red River Valley Potato Research Lab at East Grand Forks, MN. In this test, 60 second year selections, 22 third year and 59 4th year and older selections were chipped at either 43° F or 65° F and Agtron readings were taken on the chip samples. When chipped out of 65° F storage, 17 second year selections had Agtron reading of 46-50 and two had Agtron readings above 50. Of the 4th year and older selections, four selections had

Agtron readings ranging between 46-50 and a number of selections had Agtron readings between 40-45 when chipped out of 43° F. Several older selections had Agtron readings of 46-50 when chipped at 65° F.

Processing Tests - French Fries and Flakes

Twenty-seven selections and check cultivars were tested for french fry and flake quality by the Food and Nutrition Department of the College of Home Economics at NDSU (ND Table 6). NorKing Russet, ND2008-2, ND1850-5Russ and ND671-4Russ had the best score for french fry quality while NorKing Russet, Russet Norkotah and Norchip scored the best for flake quality.

North Dakota Table 1. Spacing, Fertilizer, Soil Type, Planting and Harvest Dates of the 1990 North Dakota Potato Variety Trials.

Location	Row	Spacing Plant	Fertilizer	Soil Types	Planting Date	Harvest Date
Park River	38"	12"	40-10-0 @ 150#/A	Glyndon silt loam	5/8	9/6
Grand Forks	38"	12"	22-22-12 @ 400#/A	Bearden clay loam	5/15	9/24
Williston	36"	16"	None	Williston loam	5/17	9/2

North Dakota Table 2. U.S. No. 1 Yield, Percent U.S. No. 1 and Percent Total Solids of Varieties and Selections Grown in State-wide Trials in North Dakota during 1990.

Variety or Selection	Grand Forks				Park River				Average			
	Cwt/A		%		Cwt/A		%		Cwt/A		%	
	Yield	U.S.#1	Yield	Total Solids	Yield	U.S.#1	Yield	Total Solids	Yield	U.S.#1	Yield	Total Solids
NDT-9-1068-11R	155	92.6	18.6		177	91.0	19.7		166	91.8	19.0	
Red Pontiac	165	94.9	18.2		146	91.3	18.2		155	93.1	18.4	
ND1618-13R	164	94.2	18.4		139	92.5	19.7		152	93.4	18.8	
ND1562-4R	124	84.5	18.0		160	88.4	19.9		142	86.5	18.8	
ND2264-7	124	86.8	22.4		155	87.6	20.3		140	87.2	22.0	
ND1538-1Russ	110	78.4	20.7		149	83.4	21.8		130	80.9	21.4	
ND2471-8	130	90.2	22.9		125	78.2	22.9		128	84.2	22.9	
Norchip	120	82.8	21.6		131	75.9	22.2		126	79.4	22.0	
Norgold Russet	104	72.2	19.9		145	82.0	20.7		124	77.1	20.3	
NorKing Russet	133	83.1	21.6		116	84.7	20.7		124	83.9	21.2	
ND2224-5R	108	92.6	19.4		138	87.6	19.9		123	90.1	19.7	
Red Norland	125	92.1	20.7		117	81.2	19.9		121	86.7	20.3	
Shepody	114	75.3	21.2		128	88.5	22.2		121	81.9	21.8	
ND1196-2R	114	85.7	20.5		128	84.3	20.1		121	85.0	20.3	
ND2225-1R	107	77.4	19.4		130	80.1	19.9		119	78.8	19.9	
Gemchip	124	90.0	20.5		111	81.0	21.4		118	85.5	20.9	
ND651-9	85	68.7	21.6		150	79.5	22.2		117	74.1	21.8	
ND2008-2	100	82.1	21.2		122	77.4	21.4		111	79.8	21.3	
ND860-2	110	87.0	21.8		104	72.7	23.7		107	79.9	22.7	
ND2417-6	98	76.0	20.3		115	79.3	21.6		107	77.7	20.9	
ND1995-1	104	83.3	21.8		102	79.7	22.9		103	81.5	22.2	
ND1382-6R	89	76.5	20.7		112	77.1	21.4		100	76.8	20.9	
ND671-4Russ	91	76.1	20.1		104	80.3	20.9		97	78.2	20.5	
ND2141-4Russ	102	76.7	18.6		91	74.0	18.8		96	75.4	18.8	
Frontier	99	76.9	20.7		89	76.0	22.9		94	76.5	21.8	
ND2642-8	90	66.9	21.8		96	60.6	21.8		93	63.8	21.8	
Russet Norkotah	95	79.9	21.2		90	76.2	21.2		93	78.1	21.2	
ND986-9	82	69.2	23.5		99	73.7	23.1		91	71.5	23.3	
ND1871-3R	101	87.0	18.8		65	76.4	19.2		83	81.7	19.0	
ND1725-4	65	57.0	22.2		89	59.4	22.7		77	58.2	22.4	
Russet Burbank	51	45.8	19.7		51	36.0	20.5		51	40.9	20.1	
Average	101.6	80.1	20.6		118.5	78.6	21.1		113.8	79.3	20.9	

North Dakota Table 3. Advanced Selections and Cultivars Trial Grown at
Grand Forks, ND - 1990.

Selection or Cultivar	U.S. No. 1 Yield Cwt/A	% U.S. No. 1	% Total Solids
ND1342-18	139	87.8	22.7
ND3059-1Russ	137	81.6	20.5
ND3166-2	135	84.8	19.9
Norchip	134	87.6	21.6
ND2528-5	131	91.9	20.7
Red Norland	124	88.8	20.3
ND2382-15	124	78.6	20.7
ND2845-5	120	84.0	22.4
ND2653-4	118	82.1	22.2
Norgold Russet	110	80.5	19.7
ND2676-4	110	82.9	21.2
ND2973-10	106	82.2	20.7
ND2050-1R	105	92.4	21.6
ND3196-1R	103	80.9	19.7
ND2358-20Russ	100	84.2	20.3
ND2264-4	85	81.4	22.4
ND3261-5R	84	59.4	21.4
ND3048-2R	83	88.5	18.4
ND2013-4	83	87.8	21.2
ND3133-1	77	61.8	20.7
ND2387-3	77	82.2	21.8
ND2842-3R	77	82.7	17.3
ND2611-8R	68	70.7	19.0
ND2667-9Russ	68	64.6	19.4
Average	104	81.2	20.7

North Dakota Table 4. U.S. No. 1 Yield, Percent U.S. No. 1, Percent Total Solids of Selections and Cultivars Grown in Trial at Williston, ND - 1990.

Cultivar or Selection	U.S. No. 1 Yield Cwt/A	% U.S. No. 1	% Total Solids
Red Pontiac	69	86.0	21.2
Norchip	57	64.8	23.7
Red Norland	56	78.1	22.0
ND2224-5R	55	83.4	22.9
ND2008-2	52	75.8	23.5
NDT-9-1068-11R	46	88.3	23.7
ND1196-2R	44	74.5	23.7
ND1538-1Russ	41	66.3	23.5
Norgold Russet	35	58.8	22.7
Russet Norkotah	35	67.3	23.1
Russet Burbank	30	43.2	22.2
Average	47	72.0	22.9

North Dakota Table 5. 1990 Chip Tests & Percent Yield of Cultivars & Selections Grown in Trial During 1989.

	First Chipping		Second Chipping		Third Chipping			
	40° Since Harvest		65° for Two Weeks		65° for Four Weeks		Percent Yield Ave. - 3 tests	
Cultivar or Selection	Grand Forks ¹	Park River ²	Grand Forks ³	Park River ⁴	Grand Forks ⁵	Park River ⁶	Grand Forks	Park River
----- Agtron Reading -----								
Cal-Ore	8.0	14.0	14.5	16.5	20.0	29.0	31.2	30.6
Norchip	9.5	12.5	27.5	26.0	36.5	32.5	29.7	31.1
Norgold Russet	8.5	11.5	16.0	18.5	20.5	24.0	29.1	29.2
NorKing Russet	8.5	13.0	24.0	28.0	23.0	29.5	27.5	29.9
Russet Burbank	10.0	10.0	19.5	15.5	18.0	28.5	29.0	28.4
Russet Norkotah	6.5	10.0	22.0	26.5	27.0	26.5	28.4	29.5
Shepody	7.0	10.5	11.5	28.0	22.0	35.0	30.4	31.9
651-9	14.5	15.5	28.5	38.5	39.5	42.0	28.6	30.5
671-4Russ	13.5	18.0	28.0	25.0	32.0	35.5	29.5	30.5
860-2	29.5	28.5	45.0	41.5	54.5	47.5	30.1	30.3
986-9	7.5	7.5	24.0	17.5	34.0	23.5	30.0	30.1
1538-1Russ	8.0	13.0	18.5	28.5	27.0	39.0	28.4	30.4
1725-4	20.5	26.5	42.5	47.5	41.0	50.0	29.5	31.7
1995-1	21.0	25.0	36.5	43.5	46.0	49.0	31.8	31.3
2008-2	17.5	23.0	31.5	38.0	48.0	45.0	30.0	30.4
2141-4Russ	6.5	9.5	17.0	18.0	19.5	19.0	26.6	26.9
2330-3	10.5	20.5	33.0	28.0	33.0	34.5	29.4	29.4
1342-18	16.0	--	56.0	--	31.0	--	31.7	--
1725-13	23.0	--	33.0	--	44.0	--	29.7	--
1850-5Russ	8.0	--	13.0	--	16.0	--	29.0	--
2013-4	25.0	--	29.0	--	27.0	--	30.2	--
2031-6	27.0	--	21.0	--	42.0	--	29.2	--
2062-19	12.0	--	24.0	--	29.0	--	28.8	--
2264-7	17.0	--	22.0	--	37.0	--	29.0	--
2319-8Russ	8.0	--	18.0	--	26.0	--	28.0	--
2405-18Russ	13.0	--	27.0	--	37.0	--	30.2	--
2417-6	13.0	--	34.0	--	44.0	--	31.5	--
2471-8	19.0	--	38.0	--	48.0	--	33.8	--
2642-8	26.0	--	43.0	--	47.0	--	31.0	--
2667-9Russ	8.0	--	24.0	--	22.0	--	27.8	--
2829-8Russ	14.0	--	20.0	--	41.0	--	29.8	--

¹ Chipped on 1/11/90

² Chipped on 1/9//90

³ Chipped on 1/25/90

⁴ Chipped on 1/23/90

⁵ Chipped on 2/8/90

⁶ Chipped on 2/6/90

North Dakota Table 6. Average Scores for French Fries and Flake Tests.

Cultivar or Selection	French Fries				Flakes			
	Color	Texture	Flavor	Score Rank	Color	Texture	Flavor	Score Rank
Kennebec	5.66	5.32	5.05	5.34 21				
HiLite Russet	6.28	5.59	5.46	5.78 17				
Norchip								
NorKing Russet	7.63	6.75	6.76	7.05 1				
New Shepody	6.11	5.92	4.93	5.65 18				
Old Shepody	5.57	5.50	5.52	5.36 20				
Russet Burbank	5.84	5.92	5.54	5.77 16				
Russet Norkotah	6.39	5.65	5.39	5.81 15				
Viking	4.47	5.15	4.61	4.74 23				
ND651-9	7.75	6.63	4.25	6.21 5				
ND671-4Russ	6.64	6.33	6.58	6.51 4				
ND860-2								
ND1538-1Russ	6.01	5.75	5.16	5.64 19				
ND1850-5Russ	7.67	6.05	5.86	6.52 3				
ND1859-3Y	4.82	6.13	4.07	5.00 22				
ND2000-8	6.42	6.18	5.34	5.98 10				
ND2008-2	7.40	6.70	5.66	6.59 2				
ND2141-4Russ	3.93	4.07	3.92	3.97 25				
ND2319-8Russ	6.33	5.64	5.57	5.85 14				
ND2405-18Russ	6.39	5.68	5.83	5.97 11				
ND2605-6	7.06	6.13	4.56	5.92 13				
ND2667-9Russ	6.36	5.76	6.00	6.04 8				
ND2829-8Russ	6.72	5.76	5.51	6.00 9				
ND2973-10Russ	6.82	6.41	5.10	6.11 7				
ND3059-1Russ	4.36	5.02	5.12	4.83 24				
T2-AT9-77259B-8Russ	6.22	6.28	5.82	6.11 6				
NDT2-1947-5Russ	5.93	6.13	5.74	5.93 12				

Rating Guide:

7-9 Good

5-6 Fair, but acceptable

1-4 Poor, not acceptable

OHIO

M.A. Bennett, E.M. Grassbaugh, J. Elliott, D.M. Kelly, R.L. Hassell, F.I. Lower, R.C. Rowe, K.L. Wiese, E.C. Wittmeyer

INTRODUCTION:

The purpose of the statewide variety trials is to test new varieties for the benefit of Ohio growers under various farm conditions. Cultural and pest control practices in each case are those used by the cooperating grower. Stand, vigor, plant characteristics, diseases and maturity were recorded in the fields. At harvest, the tubers are evaluated, weighed, and graded, with samples taken for chipping tests.

Eleven cultivars were planted at each of five farms. These farms were selected to give different soil and climatic conditions. The cultivars were selected either because they looked promising in previous statewide trials, and in the observation trials on two cooperating farms, or were selected from the cultivar plots at the Ohio Agricultural Research and Development Center (OARDC), Wooster.

Farm Locations

The five farms referred to in the introduction are as follows:

Farm 1 (M) - Michael Farms, Urbana, Ohio, Champaign County

Farm 2 (Th) - Thompson Farms, Hanoverton, Ohio, Columbiana County

Farm 3 (Mel) - Mellinger Farms (Crystal Springs Farm), Leetonia, Ohio, Columbiana County

Farm 4 (L) - Logan Farms, Mt. Gilead, Ohio, Morrow County

Farm 5 (C) - Chase Farms, Defiance, Ohio, Defiance County

See Table 1 for summary of cultural practices followed on these cooperating farms--planting dates, harvest dates and related information.

PROCEDURES

Eleven cultivars were planted in three replicates on each of the five farms. In addition, five cultivars were planted in triplicated plots for observation on the same

farms. Eighty seed pieces were planted in each replicate.

The seed potatoes were cut and treated on May 9 to 14. Farm No. 2 was planted on May 12 but rain delayed planting on the other farms until May 21-25. All were harvested from September 26 to October 3. The growers planters were used by driving very slowly. The potatoes were harvested with flat bed diggers, then picked up and weighed. A representative 50 lb. sample was then graded with 10 tubers cut for internal defects. A sample of each cultivar was then taken to The Ohio State University pilot plant (Columbus) for chip tests. Atlantic, Norchip, Katahdin and Superior were standard varieties used for comparison.

WEATHER AND GROWING CONDITIONS

The last four winters were unusually warm and dry. The 1988 growing season was the hottest on record and one of the driest. The 1989 season was unusually wet with almost continuous rains through May and June. The 1990 season was also wet with heavy rainfall at times that ruined crops on seemingly well drained land. Some replicates in the test plots were lost on three of the five farms. Consequently, in some cases the results may not be truly indicative of the capabilities of the cultivar. However, the figures in 1990 are far more uniform and more truly represent the characteristics of most of the entries than in 1988 and 1989.

FIELD OBSERVATIONS

The average percent stand on the two Columbiana County farms was 84% (Table 3). It was 76% on the Morrow County farm; however, this farm had the highest yields at harvest. The average stand for four farms in 1989 was 84%, one of the lowest on record. The average percent stand for the last 16 years for all farms in the trials is 88.3%.

Some bacterial stem rot was present on Farm 2 in Columbiana County. Only four entries were infected severely enough to affect yields. Twenty to twenty-seven percent of

the plants were infected with a few dead hills. The four were Norchip, MS700-83 (Spartan Pearl), Steuben and MS716-15.

Some early blight and Colorado potato beetles were observed on Farm 3 (Columbiana County) but neither were severe. Mild mosaic or other yellowing was also seen on this farm, but apparently not severe enough to affect yield or quality. The entries that definitely showed mild mosaic symptoms were Norchip, MS700-83 (Spartan Pearl), MS700-70, Superior and MS716-15.

GRADES AND YIELDS

The following tables present yield information as well as grades and defects. Surface scab was a general problem in the farm trials this year, largely due to the weather conditions. Most entries in the variety trials showed at least traces of scab. A few entries had pitted scab. Due to the damp dirt on the tubers at harvest, it was impossible to make accurate records of scab infection. Hollow heart was severe in some cultivars on four of the five farms (Table 4).

The average percent U.S. No. 1 for all entries on all the farms was 86.7 for the main trials and 87 for the observation entries. Last year it was 84% for all.

SOIL ANALYSES OF STATEWIDE TRIAL PLOTS – 1990

Test Results	-----Cooperating Farms-----				
	1	2	3	4	5
pH	6.8	6.1	5.3	6.8	5.8
P (lb/A)	748	418	1056	164	726
K (lb/A)	579	304	416	343	367
CA (lb/A)	3450	2010	1170	3800	1110
Mg (lb/A)	434	496	98	321	136
CEC (meq/100g)	11	10	11	11	5
Ca (% base sat.)	77	51	26	84	55
Mg (% base sat.)	16	21	4	12	11
K (% base sat.)	6.6	3.9	4.8	3.9	9.4
Zn (lb/A)	19.6	13.4	17.2	9.5	9.9
B (lb/A)	1.0	.8	.6	1.0	.5
OM (%)	2.4	2.0	2.1	3.2	1.0

1 – Michael Farms, Urbana

4 – Logan Farms, Mt. Gilead

2 – Thompson Farms, Hanoverton

5 – Chase Farms, Defiance

3 – Mellinger Farms, Leetonia

Soil analyses conducted at Research–Extension Analytical Lab, The Ohio Agricultural Research and Development Center, Wooster.

Table 1. Cultural and pest control practices used on Ohio statewide potato trials – 1990.

	<u>Farm 1 (M)</u>	<u>Farm 2 (Th)</u>	<u>Farm 3 (Mel)</u>	<u>Farm 4 (L)</u>	<u>Farm 5 (C)</u>
Date planted	May 22	May 12	May 21	May 25	May 24
Date harvested	Oct. 3	Sept. 27	Sept. 26	Oct. 3-4	Oct. 2
1989 crop	Sweet corn	Wheat	Corn	Corn	Potatoes
Cover crop	Rye	Rye+60 lbs.N	Cornstalks	Cornstalks	Nothing
Fertilizer	1000 lbs.	1000 lbs.	1000 lbs.	lbs. 150-175-175	70 gal. 5-15-15
applied in row	10-26-26	8-22-29	10-20-20	+ 30# S+25#MgO	28% N
side dressed	Urea				
Herbicide					
Incorporated					
Pre-emergence	Dual + Sencor	Lorox + Dual	Lorox + Dual	Lorox + Dual	
Systemic					
Insecticide	Phorate	Phorate	Phorate	Phorate	Furadan
Spacing	8" x 36"	9" x 36"	8" x 36"	9" x 36"	10 1/2" x 36"
Soil type	Silt loam	Silt loam	Silt loam	Heavy silt loam	Sandy silt loam
Soil conditions					
at planting	Good	Good	Slightly wet	Good	Good
Irrigation	Yes	If needed	No	No	No

Table 2. Rainfall and irrigation records for Ohio statewide potato trial plots – 1990.

	<u>Farm 1 (M)</u>		<u>Farm 2 (Th)</u>		<u>Farm 3 (Mel)</u>		<u>Farm 4 (L)</u>		<u>Farm 5 (C)</u>	
Date planted	May 25		May 12		May 21		May 25		May 24	
Date harvested	October 3		September 27		September 26		October 3–4		October 2	
	Rainfall – Irrig.		Rainfall – Irrig.		Rainfall		Rainfall		Rainfall	
	-----inches-----		-----inches-----		-----inches-----		-----inches-----		-----inches-----	
May	6.1		6.0		2.7		2.5(2.0Est.)		2.4	
June	4.0		3.0		3.37		3.82		6.4	
July	6.4		9.9		10.4		8.00		4.9	
August	4.5		2.6		3.6		3.15		3.3	
September	6.3		6.3		4.95		1.88		2.8	
Season Total	27.3		27.8		25.02		17.35		19.8	
June/July/August	14.9		15.5		17.37		14.97		14.6	
Avg. Yields										
U.S. No. 1										
Main Trials										
Cwt/A	173		255		255		350		176	

Table 3. Stand counts for Ohio statewide main trials and observational trials, 1990.

<u>Cultivar</u>	-----Cooperating Farms-----					<u>Mean</u>
	<u>1(M)</u>	<u>2(Th)</u>	<u>3(Mel)</u>	<u>4(L)</u>	<u>5(C)</u>	
	-----% Emergence-----					
	<u>MAIN TRIALS</u>					
Atlantic	88		85	71		81
Norchip	91		88	76		85
MS700-70	89		87	85		87
MS700-83 (Spartan Pearl)	94		87	80		87
LA01-38 (LaBelle)	69		80	61		70
Steuben (NY 81)	86		75	71		77
Gemchip (BR7093-24)	86		85	81		84
B7592-1 (Castile)	87		76	82		82
Katahdin	85		87	75		82
FL 657 (Norwis)	82		79	81		81
MS716-15	79		84	68		77
Farm Mean	85		83	76		81
	<u>OBSERVATION TRIALS</u>					
Superior	96		87	91		
Chaleur	86		84	85		
B9792-8B	97		96	96		
Coastal Chipper	92		90	91		
Saginaw Gold	82			82		
Kennebec	86			86		
Coastal Russet	92			92		
Somerset	82		80	81		
Farm Mean	89		87	88		

Table 4. Percent of B's and culls, major external and internal defects for main trial cultivars. Results are the mean values for five farms, 1990.

Cultivar	% B's	% Culls	-----Major Defects-----	
			External z	Internal (HH) y
Atlantic	5.5	6.5	Sh,Cr,2nd,Gr	17
Norchip	6.8	10.1	Sh,Cr,2nd	0.6
MS700-70	5.1	7.2	Sh,Cr,Gr,2nd	15
MS700-83 (Spartan Pearl)	6.6	8.8	Cr,Gr,Sh	10
LA01-38 (LaBelle)	3.2	8.1	Sh,Cr,Gr,2nd	5
Steuben (NY 81)	11.6	3.4	Sh,Cr,2nd	5
Gemchip (BR7093-24)	5.3	6.9	Sh,Cr,Gr	9
B7592-1 (Castile)	8.3	6.2	Sh,Cr,	7
Katahdin	7.3	5.5	Sh,Gr,Cr	8
FL657 (Norwis)	4.1	7.2	Sh,Gr,Cr	0.6
M716-15	7.4	5.8	Sh,Gr,Cr	5
Average	6.5	5.8		7.5

z Abbreviations for external defects:

Sh = misshapen

2nd = second growth

Cr = growth cracks

Gr = greening

y Abbreviations for internal defects:

HH = % Hollow Heart

Table 5. Total yield, percent U.S. No. 1 and marketable yield for main trial potato cultivars, Ohio statewide trials – 1990.

Cultivar	-----Farm 1 (M)-----			-----Farm 2 (Th)-----			-----Farm 3 (Mel)-----		
	Yield cwt/A	No. 1 %	No. 1 cwt/A	Yield cwt/A	No. 1 %	No. 1 cwt/A	Yield cwt/A	No. 1 %	No. 1 cwt/A
Atlantic	242	86	208	234	81	189	270	95	256
Norchip	226	79	179	312	79	246	278	88	245
MS700-70	172	86	148	349	83	290	273	90	246
MS700-83(Spartan Pearl)	198	78	154	234	86	201	270	88	238
LA01-38(LaBelle)	279	83	232	356	81	288	326	92	300
Steuben(N.Y.81)	179	86	154	281	84	236	296	90	266
Gemchip (BR7093-24)	219	84	184	371	84	312	315	90	283
B7592-1(Castile)	234	83	194	435	85	370	306	91	278
Katahdin	190	81	154	329	87	286	288	93	268
FL657(Norwis)	170	89	151	278	84	234	289	89	257
MS716-15	161	88	141	163	84	137	204	88	180
Mean	206	84	173	304	84	255	283	90	255

Cultivar	-----Farm 4 (L)-----			-----Farm 5 (C)-----			--- Mean of Farms 1-5---		
	Yield cwt/A	No. 1 %	No. 1 cwt/A	Yield cwt/A	No. 1 %	No. 1 cwt/A	Yield cwt/A	No. 1 %	No. 1 cwt/A
Atlantic	495	89	441	234	90	211	295	88	260
Norchip	388	88	341	211	82	173	283	83	235
MS700-70	333	95	316	181	85	156	262	88	230
MS700-83(Spartan Pearl)	384	90	346	286	80	229	274	84	231
LA01-38(LaBelle)	354	95	336	214	93	199	306	89	272
Steuben(N.Y.81)	382	93	355	178	72	128	263	85	224
Gemchip(BR7093-24)	431	93	401	234	87	204	314	85	268
B7592-1(Castile)	428	89	381	191	79	151	319	88	280
Katahdin	380	96	365	208	84	175	279	88	246
FL657(Norwis)	329	93	306	220	89	196	257	89	228
MS716-15	285	92	262	145	82	119	192	87	167
Mean	381	92	350	209	84	176	277	87	240

Table 6. Total yield, percent U.S. No. 1 and marketable yield for observational potato cultivars, Ohio statewide trials, 1990.

Cultivar	Farm 1 (M)			Farm 4 (L)			MEANS			
	Yield Cwt/A	No. 1 %	No. 1 Cwt/A	Yield Cwt/A	No. 1 %	No. 1 Cwt/A	Yield Cwt/A	No. 1 %	No. 1 Cwt/A	n
Superior	161	89	143	347	88	305	235	88	207	4
Chaleur	148	85	126	293	93	272	195	91	177	4
B9792-8B	191	85	162	364	80	291	287	84	240	4
B9792-157	231	80	185	327	84	275	275	86	237	4
MS002-1717Y				250	91	227	250	82	205	2
Kennebec				349	86	300	349	86	300	1
AF236-1(Somerset)	136	79	107	333	85	283	207	82	171	4
Mean	173	84	145	323	87	279				
Cultivar	Farm 3 (Mel)			Farm 5 (C)			MEANS			
	Yield Cwt/A	No. 1 %	No. 1 Cwt/A	Yield Cwt/A	No. 1 %	No. 1 Cwt/A	Yield Cwt/A	No. 1 %	No. 1 Cwt/A	n
Superior	236	91	217	197	84	165	235	88	207	4
Chaleur	138	92	127	199	93	185	195	91	177	4
B9792-8B	353	87	307	238	83	198	287	84	240	4
B9792-157	280	93	260	262	87	228	275	86	237	4
MS002-1717Y				249	73	182	250	82	205	2
Kennebec							349	86	300	1
AF236-1(Somerset)	156	84	131	203	82	166	207	82	171	4
Mean	233	89	208	225	84	187				

Table 7. Mean U.S. No. 1 yields in cwt per acre for major entries in the Ohio statewide potato trials of all farms each year grown in the last ten years and grown more than one year.

Cultivar	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<u>Early & Med Early</u>										
Jemseg	294	161								
Superior							131			207
Conestoga		141	230	266	321	225				
Rus. Norkotah						272	105			
<u>Early Midseason</u>										
Crystal	254									
Langlade	311	388					184	188		
Norchip	231	337	184	208	228	301	236	160	161	173
<u>Midseason</u>										
LA01-38(LaBelle)					359	413	330	235	211	199
Katahdin	292	374	238	315	335	363	276	187	178	175
<u>Late</u>										
Denali	269	300	206							
Elba (NY59)	324	373	245			393				
Neb. A129-69-1	336	341	207	278						
WNC521-12					325	344				
MS700-70							241	233	187	156

Some of the cultivars grown in Ohio for which the characteristics are well known after several years of testing have been omitted in later years. Some cultivars listed were included in the trials prior to the last ten years. Among these are Shurchip, Monona, Kennebec, Atlantic, Crystal, Sebago, Red Pontiac, Red LaSoda, etc. Katahdin, Norchip and Superior are well known and used as standards for comparison.

Table 8. Specific gravity, chip color, percent blister, and Agtron E-5F readings of potato cultivars grown at five farms in statewide trials, 1990.

Cultivar	Farm 1(M)				Farm 2 (Th)				Farm 3 (Mel)			
	Specific Gravity	Chip Color y	Blister %	Agtron z	Specific Gravity	Chip Color	Blister %	Agtron	Specific Gravity	Chip Color	Blister %	Agtron
Atlantic	1.083	2	30	51.1	1.078	2	20	50.9	1.073	2	10	48.5
Norchip	1.071	2	20	45.4	1.079	2	30	48.8	1.075	2	40	53.3
MS700-70	1.077	2	20	49.4	1.094	2	0	48.8	1.079	2	10	49.3
MS700-83	1.070	3	20	42.6	1.080	3	40	47.1	1.073	2	40	44.4
LA01-38	1.067	2	10	52.4	1.071	2	20	47.8	1.073	2	10	49.3
Steuben(NY 81)	1.067	2	20	50.6	1.067	2	0	51.3	1.066	2	10	44.5
Gemchip	1.061	2	10	43.3	1.072	3	30	40.3	1.075	3	30	37.9
(BR7093-24												
B7592-1	1.074	2	20	57.7	1.074	3	20	39.0	1.072	3	40	42.7
Katahdin	1.068	3	20	45.0	1.069	3	20	37.3	1.067	2	10	46.7
FL657	1.063	2	10	50.3	1.066	2	10	48.0	1.067	2	10	45.5
MS716-15	1.079	4	40	34.4	1.078	1	10	47.4	1.077	3	20	40.7
Farm Mean	1.071	2.4	20	47.5	1.077	2.3	18.2	46.1	1.072	2.3	20.9	45.7

Cultivar	Farm 4 (L)				Farm 5 (C)			
	Specific Gravity	Chip Color	Blister %	Agtron	Specific Gravity	Chip Color	Blister %	Agtron
Atlantic	1.069	3	30	40.4	1.082	2	30	45.4
Norchip	1.089	3	30	46.3	1.067	3	40	36.1
MS700-70	1.084	3	10	31.7	1.060	2	40	42.4
MS700-83	1.078	3	30	47.8	1.072	3	20	38.7
LA01-38	1.075	3	10	50.5	1.071	3	40	51.5
Steuben(NY 81)	1.074	2	10	55.4	1.063	2	20	43.8
Gemchip	1.061	3	20	37.5	1.072	2	40	52.2
(BR7093-24								
B7592-1	1.076	3	30	48.3	1.070	2	40	38.2
Katahdin	1.075	3	20	40.2	1.071	3	30	41.8
FL657	1.072	3	10	42.4	1.061	2	30	42.3
MS716-15	1.081	3	30	39.1	1.065	2	10	45.7
Farm Mean	1.076	2.9	20.9	43.6	1.069	2.4	30.9	43.5

y PC/SFA Standards; 1=light (high Agtron index readings), 5=dark (low Agtron index readings).

z Percentage of chips that develop blisters > 20 mm in diameter during the frying process.

Table 9. Mean specific gravity, chip color, percent blister and Agtron E-5F readings based on statewide main potato cultivar trials from five farms - 1990.

Cultivar	Specific Gravity	Chip Color y	% Blister z	Agtron
Atlantic	1.077	2.2	24	47.3
Norchip	1.075	2.4	32	46.0
MS700-70	1.079	2.2	18	44.3
MS700-83 (Spartan Pearl)	1.075	2.2	30	44.1
LA01-38 (LaBelle)	1.071	2.4	18	50.3
Steuben (NY81)	1.067	2.0	12	49.1
Gemchip (BR7093-24)	1.068	2.6	26	42.2
B7592-1 (Castile)	1.073	2.6	30	45.2
Katahdin	1.070	2.8	20	42.2
FL657 (Norwis)	1.066	2.4	14	45.7
MS716-15	1.076	2.6	22	41.5
Mean	1.073	2.5	22.2	45.3

y PC/SFA standards; 1=light, 5=dark (low Agtron index readings).

z Percentage of chips that develop blisters > 20 mm in diameter during the frying process

Observation Trials (Wooster) Table 1. Total yields, U.S. No. 1 yields and grade distribution for observation entries, 1990

Cultivar	Yield Cwt/A	Total No. 1 Cwt/A	U.S. No. 1 -----	U.S. B size ---%---	Culls -----
Somerset	295	245	83	5	12
Red Gold	339	292	86	9	5
Chaleur	232	204	88	1	11
WF31-4	247	222	90	3	7
Chieftan	319	271	85	4	11
Green Mountain	329	250	76	3	21
Caribe	440	392	89	2	9
Sangre	513	462	90	3	7
Rosa	339	295	87	6	7
W100	242	215	89	4	7
CS7635-4	227	195	86	2	12
CS7697-24	276	232	84	4	12
S-3	411	378	92	1	7
S-2	184	178	97	0	3
WS440	261	232	89	4	7
C082142-4	218	181	83	8	9
AC75430-1	232	181	78	6	15
B0178-14	344	296	86	10	4
B0255-9	310	248	80	6	15
MN13035	382	321	84	7	9
B0325-5	256	212	83	15	2
B0312-10	334	291	87	10	3
B0306-6	237	194	82	7	11
B0311-2	252	169	67	13	20

Observation Trials (Wooster) Table 2. Tuber data and internal disorders for observation entries, 1990.

Cultivar	Tuber Data ^z				Internal Disorders ^y				
	Tuber	Skin	Tuber	Eye	Overall	Internal	Hollow	Vascular	Defect
	Color	Texture	Shape	Depth	Appear.	Necrosis	Heart	Discoloration	Free
Somerset	7	7	5	8	7	0	0	0	10
Red Gold	3	6	2	6	7	0	0	0	10
Chaleur	7	7	5	7	5	0	0	0	10
WF 31-4	5	4	3	6	6	0	2	0	8
Chieftain	2	6	7	7	7	0	0	0	10
Green Mountain	6	7	5	4	4	0	0	1	9
Caribe	1	7	6	6	6	0	0	0	10
Sangre	2	6	4	5	5	0	0	0	10
Rosa	7	8	2	8	8	0	1	0	9
W 1000	6	5	3	7	6	0	0	0	10
CS 7635-4	7	7	2	7	8	0	0	0	10
CS 7697-24	7	9	3	6	7	0	0	0	10
S-3	7	8	3	7	5	0	0	0	10
S-2	7	7	6	5	5	0	0	0	10
WS 440	6	7	6	6	4	0	0	0	10
CO82142-4	4	3	7	8	8	0	3	0	7
AC 75430-1	5	3	7	8	6	0	4	0	6
BO 178-14	7	4	2	7	7	0	2	0	8
BO 255-9	6	4	3	5	5	0	2	0	8
MN 13035	2	6	6	5	7	0	0	0	10
BO 325-5	4	3	7	8	8	0	2	0	8
BO 312-10	5	3	7	8	6	0	3	0	7
BO 306-6	5	3	7	8	7	0	1	0	9
BO 311-2	4	3	8	8	8	0	0	0	10

^y Hollow heart and internal necrosis ratings indicate the number of affected tubers found per 10 tubers sampled

^z Tuber Data Rating System

Tuber Color: 1) purple 2) red 3) pink 4) dark brown 5) brown 6) tan 7) buff 8) white 9) cream

Skin Texture: 1) part. russet 2) heavy russet 3) mod. russet 4) light russet 5) netted 6) slight net.

7) mod smooth 8) very smooth

Tuber Shape: 1) round 2) mostly round 3) round to oblong 4) mostly oblong 5) oblong 6) oblong to long

7) mostly long 8) long 9) cylindrical

Eye Depth: 1) very deep 2) --- 3) deep 4) --- 5) intermediate 6) --- 7) shallow 8) --- 9) very shallow

Appearance: 1) very poor 2) --- 3) poor 4) --- 5) fair 6) --- 7) good 8) --- 9) excellent

Advanced Observation Trials (Wooster) Table 1. Total yields, U.S. No. 1 yields, grade distribution, specific gravity, chip color, percent blister and Agtron readings for advanced observation entries, 1990.

Cultivar	Total Yield cwt/A	-----%-----				Scab Area Type z	Specific Gravity	Chip Color y	% Blister x	Agtron E-5F
		U.S. No. 1 cwt/A	U.S. No. 1	B. size	culls					
NEA 22.75-1	300	243	81	2	17	0	1.063	5	50	19.1
AC 81198-11	279	204	73	6	21	T-1	1.069	5	40	14.8
CS 7232-4	247	200	81	4	15	0	1.074	2	10	46.5

x Percentage fo chips that develop blisters > 20 mm in diameter during the frying process

y PCiSFA standards, 1=light, 5=dark (low Agtron index readings).

z Area - T-less than 1%; 1-10-20%; 3-41-60%; 4-61-80%; 5-81-100%.

Type - 1. Small, superficial; 2. Larger, superficial; 3. Larger, rough pustules; 4. Larger pustules, shallow holes; 5. Very large pustules, deep holes

Advanced Observation Trials (Wooster) Table 2. External defects and internal disorders for advanced observation entries, 1990.

Cultivar	---% External Defects---			-Internal Disorders-			
	Growth Cracks	2nd Growth	Sun Grn	%defect Free	HH	Int. Nec.	Defect Free
NEA22.75-1	2	3	2	93	5	0	25
AC81198-11	7	8	0	85	2	0	28
CS7232-4	0	0	3	97	0	0	30

Hollow heart and internal necrosis ratings indicate the number of affected tubers found per 30 tubers sampled

OHIO (continued)

NE-107Introduction: Thirty-seven varieties and clones were tested in 1990 at the Ohio Agricultural Research and Development Center, Wooster, as part of the NE107 Regional Project (Breeding and Evaluation of Potato Clones for the Northeast).

Methods:

Plots were planted on May 24, 1990, with 30 hills spaced 12 inches apart, in rows 36 inches apart. A randomized complete block design with 3 replications was used. The experimental area had a good stand of alfalfa killed in the fall of 1989. Soil type was a Wooster silt loam (fine-loamy, mixed, mesic Typic Fragiudalf) with a pH of 6.0 and an organic matter of 3.0%. Fertilization consisted of 1200 lbs/A 10-20-20, one-half applied at plow-down, and the remainder banded at planting. Herbicides used were Dual/Lexone. Pesticides included Bravo 720, Thiodan, Pydrin, and Penncap. Plots were vinekilled on August 30, which was 98 days after planting. All plots were mechanically harvested on September 13, 1990. Chip samples were stored at 52°F and chipped 63 days after harvest. Chip color was evaluated using the standards established by the Potato Chip/Snack Food Association (PC/SFA). Objective color measurements were made with the Agtron E-5F. Specific gravity was determined using the potato hydrometer method. Hollow heart and internal necrosis ratings (Ohio Table 2) indicate the number of affected tubers found per 30 tubers examined.

Results:

The 1990 growing season at Wooster was nearly ideal for potato growth and development. Top yielding entries included AF1060-2, Allegany, Coastal Chip, Steuben, B0257-3, NYE55-35, B9792-8B, NYE57-13, Russet Norkotah, and Superior. These ten varieties/clones produced U.S. No. 1 yields of over 300 cwt/A, and percentage of U.S. No. 1 ranged from 80%-92%. Allegany, AF1060-2, B0257-3, B9792-8B, and Russet Norkotah received overall tuber appearance ratings of good to very good. Potential for hollow heart was noted for five of the ten top-yielding entries (B9792-8B, Coastal

Chip, NYE57-13, Steuben, and Russet Norkotah) with a range of 8 to 1 affected tubers/30 tubers sampled, respectively (Ohio Table 2). Allegany had a high incidence of very large tubers, while B0257-3 would benefit from strategies to increase tuber size.

Promising russet entries (in addition to Russet Norkotah) included A74114-4 (Frontier Russet) and Coastal Russet. Total yields ranged from 305-336 cwt/A, with 78%-84% U.S. No. 1. A74114-4 showed potential for hollow heart, however, under 1990 Ohio growing conditions.

TUBER DATA RATING SYSTEM
for
POTATO VARIETY TRIALS-NE 107

Tuber Skin Color

1. Purple
2. Red
3. Pink
4. Dark Brown
5. Brown
6. Tan
7. Buff
8. White
9. Cream

Eye Depth

1. VD
2. --
3. D
4. --
5. Intermediate
6. --
7. S
8. --
9. VS

Skin Texture

1. Part. russet
2. Heavy russet
3. Mod. russet
4. Light russet
5. Netted
6. Slight net.
7. Mod. smooth
8. Smooth
9. Very smooth

Appearance

1. Very poor
2. --
3. Poor
4. --
5. Fair
6. --
7. Good
8. --
9. Excellent

Tuber Shape

1. Round
2. Mostly round
3. Rd. to obl.
4. Mostly obl.
5. Oblong
6. Obl. to long
7. Mostly long
8. Long
9. Cylindrical

PLANT DATA RATING SYSTEM

Plant Type

1. decumbent-poor canopy
2. decumbent-fair canopy
3. decumbent-good canopy
4. spreading-poor canopy
5. spreading-fair canopy
6. spreading-good canopy
7. upright-poor canopy
8. upright-fair canopy
9. upright-good canopy

Plant Size

1. very small
2. +
3. small
4. +
5. medium
6. +
7. large
8. +
9. very large

Plant Maturity

1. very early
2. early
3. +
4. medium early
5. medium
6. medium late
7. +
8. late
9. very late

Air Pollution

0. dead
1. decreasing plant appearance
2. with varying degrees
3. of defoliation
- 4.
5. most leaves have symptoms, but generally appearance is still good
6. good plant condition with decreasing
7. percent of foliar symptoms
- 8.
9. no symptoms

Plant Appearance

1. v. poor
2. poor
3. +
4. --
5. fair
6. +
7. --
8. good
9. excellent

Ohio NE107 Table 1. Yield, marketable yield, percent of yield by grade size distribution and specific gravity for varieties grown at Wooster, Ohio - 1990

Variety	Total Yield Cwt/A	Marketable Yield		Size Distribution by Class(% of total yield)			Specific Gravity
		Cwt/A	% of STD	U.S. No.1 (> 1-7/8")	B size	Culls	
AF1060-2	462	383	184	83	5	12	1.069
Allegany	394	362	174	92	2	6	1.073
Coastal Chip	394	315	151	80	6	14	1.084
Steuben	381	324	156	85	1	14	1.078
B0257-3	379	322	155	85	9	6	1.093
NYE55-35	374	325	156	87	7	6	1.075
B9792-8B	373	313	150	84	4	12	1.085
Norchip	370	285	137	77	4	19	1.085
F82026	361	289	139	80	9	11	1.076
NYE57-13	361	318	153	88	8	4	1.079
Russet Norkotah	360	328	158	91	5	4	1.093
Kennebec	342	287	138	84	4	12	1.068
Superior	337	307	147	91	2	7	1.073
A74114-4	336	262	126	78	7	15	1.081
B0241-8	329	299	144	91	7	5	1.074
B0242-3	326	274	132	84	5	11	1.078
NYE55-27	319	284	137	89	5	6	1.086
Atlantic	319	278	134	87	6	7	1.079
Monona	307	243	117	79	5	16	1.068
AF828-5	306	282	136	92	1	7	1.065
Coastal Russet	305	256	123	84	13	3	1.076
Saginaw Gold	292	234	112	80	4	16	1.079
NY85	289	237	114	82	6	13	1.094
NYE40-10	286	260	125	91	3	6	1.062
Norland	285	245	118	86	3	11	1.066

Ohio NE107 Table 1. (continued)

Variety	Total Yield Cwt/A	Marketable Yield		Size Distribution by Class(% of total yield)			Specific Gravity
		Cwt/A	% of STD	U.S. No. 1 (>1-7/8")	B size	Culls	
LA01-38	279	226	109	81	4	15	1.073
NY84	274	236	113	86	5	9	1.064
CS7639-1	273	205	99	75	5	20	1.071
WNC672-2	266	235	111	87	3	10	1.077
B0175-20	261	175	84	67	1	32	1.084
F77087	252	227	109	90	4	6	1.073
NYE55-44	250	227	109	91	3	6	1.078
B0220-14	250	217	104	87	4	9	1.074
Katahdin (std)	242	208	100	86	2	12	1.064
AF875-16	237	199	96	84	2	14	1.091
NY78	210	178	86	85	4	11	1.066
B9792-158	198	164	79	83	1	16	1.076
W.D. LSD (K=100,5% level)		76					

Ohio NE107 Table 2. Tuber shape and appearance, hollow heart ratings, internal necrosis ratings and chip color for varieties grown at Wooster, Ohio – 1990.

Variety	Vine Data		1		Hollow Heart %	Internal Necrosis %	2 Chip Color
	---at vinekill---		--Tuber Data---	Appear-			
	Plant Size	Maturity	Shape	ance			
AF1060-2	8.3	7.0	2	7	0	0	3
Allegany	7.3	6.0	3	8	0	0	3
Coastal Chip	8.3	7.7	2	4	17	0	2
Steuben	8.3	7.7	3	6	10	0	3
B0257-3	7.0	7.0	2	7	0	0	2
NYE55-35	9.0	8.3	2	5	0	0	5
B9792-8B	7.0	7.0	7	7	27	0	3
Norchip	6.3	6.0	4	5	0	0	2
F82026	8.3	7.3	4	5	7	0	3
NYE57-13	8.3	6.7	2	5	13	0	4
Russet Norkotah	8.0	5.0	7	7	3	0	2
Kennebec	6.7	6.0	7	4	0	0	4
Superior	7.7	6.3	5	5	0	0	2
A74114-4	7.7	5.7	6	6	10	0	2
B0241-8	8.0	7.0	2	7	40	0	3
B0242-3	8.3	8.3	3	4	3	0	2
NYE55-27	9.0	7.3	2	7	0	0	2
Atlantic	8.3	6.7	3	6	27	0	3
Monona	5.7	6.0	3	3	7	0	2
AF828-5	9.0	7.7	3	7	7	0	3
Coastal Russet	8.0	6.7	7	7	0	3	5
Saginaw Gold	6.0	6.3	3	4	0	0	3
NY85	8.0	6.3	3	6	10	0	2
NYE40-10	7.3	5.0	2	5	0	0	4
Norland	8.3	6.3	3	5	0	0	4
LA01-38	8.7	6.7	5	6	0	0	3
NY84	7.0	6.3	3	5	0	0	5
CS7639-1	7.3	7.0	6	6	3	0	5
WNC672-2	8.3	8.0	3	5	0	0	3
B0175-20	8.7	7.3	7	5	10	3	2
F77087	7.3	5.7	5	5	43	0	4
NYE55-44	8.7	7.3	3	8	7	0	2
B0220-14	8.7	7.3	6	7	60	0	2
Katahdin (std)	8.7	7.3	3	7	13	0	3
AF875-16	7.3	5.3	3	6	50	0	2
NY78	8.3	7.0	3	7	0	0	2
B9792-158	8.3	7.7	7	5	23	0	2

1 See standard NE 107 rating system

2 PC/SFA standards

Ohio NE107 Table 3. Plant stand, plant type, air pollution, percent blister, Agtron readings, and additional tuber data for varieties grown at Wooster, Ohio - 1990

Variety	Plant Stand	Plant Type	Air Pollution	% y Blister	Agtron E-5F	Plant Appearance	Tuber Data-----z			
							Texture	Eye Depth	Skin Color	
AF1060-2	87	8.7	6.7	20	42.3	7.0	7	7	7	7
Allegany	92	7.3	6.0	20	31.8	6.0	6	7	7	7
Coastal Chip	91	8.0	7.7	10	42.0	8.0	6	4	4	6
Steuben	71	8.0	6.0	30	31.8	7.7	5	7	7	6
B0257-3	93	8.0	7.3	10	40.0	6.7	7	7	7	6
E55-35	88	9.0	8.0	10	19.9	8.0	6	5	5	5
B9792-8B	88	7.7	8.7	20	41.5	7.0	7	6	6	6
Norchip	88	6.0	5.0	20	44.4	6.3	7	6	6	6
F82026	79	8.7	7.0	50	39.9	7.3	7	6	7	7
E57-13	81	8.3	7.3	20	27.0	7.7	6	7	6	6
Russet Norkotah	85	8.7	4.3	10	47.6	6.7	4	8	5	5
Kennebec	78	7.7	6.0	10	31.3	6.0	7	5	7	7
Superior	85	8.7	7.7	10	46.7	7.3	6	5	7	7
A74114-4	85	8.7	5.7	10	47.4	6.7	4	6	5	5
B0241-8	79	8.0	5.7	10	36.4	7.0	7	6	7	7
B0242-3	88	9.0	8.0	10	53.7	8.0	6	5	6	6
E55-27	64	9.0	6.7	10	48.3	8.0	6	7	6	6
Atlantic	85	7.7	7.0	10	46.7	6.7	5	5	6	6
Monona	87	5.7	6.2	10	44.8	6.3	7	5	7	7
AF828-5	73	9.0	6.7	10	37.4	8.3	7	6	6	6
Coastal Russet	79	9.0	7.0	30	14.4	7.3	4	5	5	5
Saginaw Gold	75	8.3	7.3	20	43.5	7.3	7	7	6	6
N.Y.85	84	8.7	6.0	20	37.9	6.7	6	7	6	6
E40-10	72	7.7	4.0	0	18.9	6.3	4	7	7	7
Norland	89	8.0	7.0	50	29.3	6.0	7	6	2	2

Ohio NE107 Table 3 (continued)

Variety	% Plant Stand	Plant Type	Air Pollu- tion	% Blister	Agron E-5F	Plant Appear- ance	Tuber Data-----		
							Skin Texture	Eye Depth	Skin Color
LA01-38	52	8.7	4.0	60	36.1	7.3	7	6	5
N.Y.84	61	7.0	7.0	30	24.3	6.6	7	5	6
CS7639-1	56	9.0	6.3	10	17.1	7.0	7	7	6
WNC672-2	82	9.0	7.3	20	30.6	8.0	5	7	6
B0175-20	81	8.7	8.0	10	51.3	7.7	8	6	7
F77087	81	8.0	5.0	30	35.0	6.3	7	6	7
E55-44	61	8.7	6.7	30	47.6	7.7	6	8	7
B0220-14	70	8.0	6.0	10	44.1	7.3	3	7	5
Katahdin (std)	71	7.7	6.7	20	30.7	7.0	8	6	7
AF875-16	75	7.0	6.3	10	52.9	6.0	7	7	7
N.Y.78	75	8.3	6.7	20	39.6	7.3	7	8	7
B9792-158	73	8.7	7.3	10	52.3	7.3	7	5	6

y Percentage of chips that develop blisters greater than 20 mm in diameter during the frying process

z See standard NE107 rating system

Table 1. (Fremont) Plant stand, total yields, U.S. No. 1 yields, grade distribution, specific gravity and internal disorders for Fremont entries, 1990.

Cultivar	Plant Stand %	Total Yield Cwt/A	U.S. No. 1 Cwt/A	U.S. No. 1 ----- %	B Size ----- %	Culls -----	Specific Gravity	Internal Disorders z		
								Hollow Heart	Hollow Heart	Internal Necrosis
Steuben (NY 81)	88	302	222	74	24	2	1.067	1	1	0
Saginaw Gold	96	266	215	80	16	4	1.079	0	0	0
W1059 Russ	85	211	99	47	36	17	1.070	0	0	0
ND 15381 Russ	95	186	93	48	47	5	1.067	.5	.5	0
W 1005 Russ	93	325	174	54	33	13	1.074	3	3	0
ND 1113-10	93	183	125	56	40	4	1.065	.5	.5	0
Snowden (W855)	84	262	194	73	24	3	1.080	1	1	0
Russet Norkotah	95	279	205	74	18	8	1.066	.7	.7	0

All data based on 4 reps except for:

Saginaw Gold = 6reps
W1509 Russ = 3 reps
ND 15381 Russ = 2 reps

z Hollow heart and internal necrosis ratings indicate the number of affected tubers found per 10 tubers sampled.

PLANTED: May 11, 1990

FERTILIZER: 100 lbs. N Broadcast

75 lbs. N at planting

50 lbs. N sidedress 6 wks. after planting

50 lbs. N sidedress 9 wks. after planting

HARVEST DATE: Oct. 18, 1990

PLANT SPACING: Row length 30'; 36 in. between rows,
12 in. spacing within rows

PEST MANAGEMENT: Furadan 1 1/2 lbs/1000' row; May 11, 1990

Table 2. (Fremont) Specific gravity, % blister, chip color and Agtron readings for Fremont entries, 1990.

Cultivar	Specific Gravity	% Blister z	Chip Color y	Agtron E -5F
Steuben (NY 81)	1.067	18	2	39.8
Saginaw Gold	1.079	23	3	36.3
W1059 Russ	1.070	43	3	24.4
ND 15381 Russ	1.067	15	4	25.4
W 1005 Russ	1.074	23	3	31.5
ND 1113-10	1.065	10	4	19.0
Snowden (W855)	1.080	20	2	41.4
Russet Norkotah	1.066	23	4	23.2

y PC/SFA Standards; 1=light, 5=dark (low Agtron index readings).

z Percentage of chips that develop blisters > 20 mm in diameter during the frying process.

Appendix A. Summary of reported general merit ratings for varieties in the 1990 North Central Regional Potato Trials.

Variety	ALB	IA	IN*	K	LA*	Manit	MI	MN	MO*	NJ	ND	NE	OH	ONT	SD	WI*	n	pts.	Rating
----Total----																			
Ave.																			
EARLY TO																			
MEDIUM MATURITY																			
Norland						5					5						2	10	5
Norchip					3	3											2	6	3
Norgold Russet					5			5									2	10	5
ND 1196-2R	1									5	3	5	3		4		6	21	3.5
ND 2008-2						2											1	2	2
MEDIUM LATE TO																			
LATE MATURITY																			
MN 12966	4											2					2	6	3
MN 13540								3			4			5			3	12	4
MN 13740	2		4							2				2			4	10	2.5
Mich. 401-1										3		4					2	7	3.5
Mich. 402-8	1																1	1	1
ND 1538-1Russ	3		1				4	1		4	2		4	4			8	23	2.9
LA 12-59	4	3	2		4		1				1	3	1		3		9	22	2.4
Wisc. 856	2						2	2							1		4	7	1.8
Wisc. 870	5	5					3	4		1		1		1	2		8	22	2.8
Wisc. 877							5								3	5	3	13	4.3
Red Pontiac						1						2	5				3	8	2.7
Russet Burbank																			

* Ratings not received

OREGON

A. Mosley, D. Hane, S. James, C. Stanger, and K. Rykbost

Introduction

Results of 11 Oregon trials are summarized in this report. Of these, five were situated in grower fields and exposed to typical commercial production practices except for planting and harvest operations. Trials typically used a randomized block design with four replications. Individual plots consisted of single rows averaging 25 ft. in length; seed pieces were spaced 9 to 12 in. apart in 34-in. rows. Additional information for these and many other Oregon trials are available from the authors.

Oregon results for the Western Regional Trial are presented elsewhere in this volume under the authorship of J. Pavék and others.

Statewide Trial

Forty selections were evaluated on branch experiment stations at Hermiston, Klamath Falls, Ontario, and Powell Butte. The Hermiston and Ontario sites are extremely long season with yield potentials almost double the national average. Conversely, Klamath Falls and Powell Butte are high elevation, short season sites characterized by moderate yields, especially for late maturing varieties. Trials were planted, cultured, and harvested in accordance with normal grower practices in the four areas.

Data presented in Table 1 are means for the four locations. Based on averages alone, thirty of the forty entries produced higher US No. 1 yields than Russet Burbank (Table 1). A difference of 50 to 75 cwt per acre is probably required for statistical significance, however. Most selections produced lighter-colored fries with less tendency toward sugar-ends than Russet Burbank. Five entries appeared to be more susceptible than Russet Burbank to hollow heart. Entries were evaluated for blackspot bruise, brown center, internal brownspot, and vascular discoloration but data are not included because only minor differences were noted among entries.

Based on overall promise for either fresh market or processing, 16 of the 35 numbered selections will be retained for further evaluation in the Oregon Statewide Trial or advancement to the Tri-State and Western Regional trials.

Selections showing exceptional promise for fresh market include A74212-1E, A74212-1L (to be named Century Russet), A085031-7, and N02904-7; promising multi-use and/or processing selections include A082281-1, A082611-7, and A082283-1 (yellow flesh).

Chipping Trials

Results of two Willamette Valley and one Columbia Basin chipping trial(s) are presented here. Most entries in Willamette Valley tests were common to both sites, one of which was

located on a commercial farm near Jefferson; the second was conducted on the Oregon State University vegetable research farm at Corvallis.

Entries showing promise at both Willamette Valley locations (Tables 2A-3B) included AC80545-1, AF875-15, E57-13, Gemchip, LaBelle, and Snowden; in addition, B9792-157, E55-35, and Steuben performed well at one location or the other. B9792-157 showed a strong tendency toward hollow heart at both locations, while E57-13 and W842 were somewhat susceptible at one site. Selections differed substantially in dormancy and sprout growth, especially at 50°F.

Snowden was clearly the outstanding entry in these trials based on yield and chip color from both 40 and 50°F storage. Snowden chipped fairly well from 40°F as did ND01496-1 and W842; all three would probably chip dependably from 45°F storage, but data are not available to validate that supposition. Snowden tubers were relatively small and could probably benefit from wider within-row spacing. Snowden has performed erratically in other production areas. Reports suggest that spacing x nitrogen rate trials might be extremely valuable in maximizing performance of this potentially outstanding chipper. Willamette Valley trials will address these factors in 1991.

Five chippers were compared to Norchip and Atlantic in an early trial (planted March 3, harvested August 2) on a commercial farm near Hermiston (Table 5). Norchip yields were extremely low compared to most other entries. AC83306-1 apparently has tremendous yielding potential in the Columbia Basin based on U.S. No. 1 yields of 756 cwt per acre in this early-harvested trial. As expected, all selections chipped satisfactorily because of warm temperatures associated with early harvests.

Russet Trials

Russet-skinned selections were compared in the Willamette Valley and at three Columbia Basin sites. The Valley trial was relatively short-season because of late planting due to rain. One early-harvest and two full-season russet trials were conducted at Hermiston.

Nine selections were compared to Russet Burbank for fresh market potential at Corvallis (Table 4). A74212-1E, Russet Norkotah, and CO08014-1 produced extremely good yields. Russet Norkotah tubers were more attractive than those of the other two high-yielding selections because of a tendency toward flatness in CO08014-1 and light russetting in A74212-1E. A082281-1 appeared to be quite susceptible to hollow heart at Corvallis but not especially so at Hermiston (Table 7 and 8). Ranger Russet, released by the USDA and cooperating states in

1991, produced yields similar to those of Russet Burbank. Large differences in sprouting were noted at both storage temperatures.

A74212-1E also performed well in early-harvest trials at Hermiston (Table 6). A74212-1E tubers resembled those of Norgold in color and tuber shape but were somewhat more lightly russeted. A74212-1E appears to have excellent potential for fresh market under a wide range of conditions and generally performs better than the parent clone, A74212-1L.

Nine varieties and selections were compared to Russet Burbank on two commercial farms near Hermiston (Tables 7 and 8). Most entries substantially outyielded Russet Burbank. Frontier Russet, however, yielded very poorly in these trials for unknown reasons. Ranger Russet, A083037-10, A082281-1, and C008014-1 showed good potential for french fry processing, while A74212-1E and Century Russet (A74212-1L) appeared to have promise for tablestock use. Century Russet produced especially large tubers and would probably have benefitted from close within-row spacing.

Oregon Table 1. Average Performance of 40 Potato Varieties and Advanced Selections at Four Oregon Locations.^{1/} Oregon Statewide Trial. 1990.

Entry ^{2/}	Yield, cwt/A		% ^{3/}	%			Fry ^{4/}	SE ^{5/}	% ^{6/}	Use ^{7/}	Plans ^{8/}
	Total	No. 1	RB	No. 1	Tuber	Grav	Color	%	HH		
R. Burbank	539	343	100	63	7.55	1.076	26	25	9	F,P	RC
Lemhi	479	391	114	81	9.55	1.085	35	0	9	P	RC
Norgold	416	324	94	77	6.09	1.068	33	1	4	R	RC
Norkotah	433	351	102	81	7.77	1.066	29	11	1	F	RC
Norchip	461	325	95	70	6.42	1.077	45	0	0	C	RC
A74212-1L	589	488	142	82	10.23	1.074	27	9	0	F	R
A74212-1E	609	531	155	87	8.89	1.073	26	16	0	F	R
CO08014-1	533	424	124	79	9.39	1.077	44	0	3	P	R
AO82283-1	599	466	136	77	8.28	1.085	47	0	6	P	R
AO8261-1-7	564	446	130	79	9.02	1.080	39	0	0	P	R
CO083008-1	530	464	135	87	8.47	1.085	42	0	0	P	R
AO83037-10	585	484	141	82	10.15	1.075	33	3	5	P	R
AO83177-6	564	458	133	81	7.62	1.078	32	13	0	P	R
AO82281-1	563	483	141	85	10.00	1.079	37	1	12	P	R
AO83196-15	555	487	142	87	9.50	1.075	28	17	12	F	D
ND02845-1	465	339	99	72	7.15	1.076	37	0	1	C	D
ND02904-7	515	468	136	90	10.33	1.075	31	5	0	F	R
ND03057-2	491	378	110	76	7.30	1.065	27	15	0	F	R
CO084206-2	528	424	124	80	7.84	1.065	22	30	0	F	R
AO84050-2	569	496	145	87	8.75	1.086	28	14	6	P	D
AO84134-1	519	429	125	82	12.15	1.086	40	0	21	P	D
AO84172-6	438	318	93	72	5.52	1.083	41	3	6	P	D
CO084026-201	578	460	134	79	7.72	1.074	37	0	2	F	D
CO084055-205	436	348	101	79	7.24	1.084	39	1	6	P	D
AO84515-2	541	471	137	87	11.05	1.075	28	14	5	F	D
AO85004-3	437	320	93	73	7.23	1.083	37	2	13	P	D
AO85010-1	535	402	117	75	7.77	1.081	32	5	5	P	R
AO85010-10	563	439	128	78	6.17	1.082	35	3	1	P	D
AO85027-1	587	471	137	118	9.39	1.075	26	18	3	F	D
AO85031-7	673	532	155	93	9.81	1.080	31	6	7	F	R
AO85066-2	469	399	116	85	9.10	1.074	39	0	0	F	R
AO85116-1	374	280	82	75	8.70	1.081	34	2	5	P	D
AO85164-2	531	400	117	75	7.93	1.084	41	6	1	P	D
AO85165-1	609	508	148	83	9.21	1.072	29	8	6	F	R
AO85165-2	561	458	133	81	10.83	1.077	30	2	14	P	D
AO85205-2	440	333	97	75	6.05	1.082	35	8	6	P	D
AO85224-1	484	309	90	63	7.22	1.082	38	5	1	P	D
AO85257-2	469	357	104	76	8.89	1.088	38	1	3	P	D
AO85334-1	505	406	93	80	9.49	1.075	33	10	0	F	D
CO085004-1	388	320	71	82	8.21	1.091	43	0	0	C	R

^{1/}Locations = Hermiston, Klamath Falls, Ontario, Powell Butte.

^{2/}AO = Aberdeen cross, Oregon selection, COO = Colorado Cross, Oregon Selection.

^{3/}Percent of RB based on US No. 1 yields; RB = Russet Burbank.

^{4/}Percent of reflectance; high numbers = light fry color.

^{5/}SE = sugar-end or dark-end.

^{6/}HH = Hollow heart

^{7/}F = fresh market; P = french fry processing; c = chips.

^{8/}Plans: R = retain for further testing; RC = retain as a check; D = discard.

Oregon Table 2A. Average Yield, Grade, Specific Gravity, and Tuber Characteristics of 20 Chipping Selections Grown at Corvallis, Oregon. 1990.

Entry	Yield, cwt/A		Percent		Oz/ Tuber	Spec. ^{1/} Grav	% HH ^{2/}	Major Ext. ^{3/} Defects
	Total	US #1	US #1	<2"				
AC80545-1	632	482	76.2	4.4	8.4	085	0.0	K, GC, G
AF875-15	582	471	80.9	9.7	5.4	094	2.0	GC, G
AF875-16	442	313	70.8	3.3	5.8	098	10.0	GC, G
AF1203-5	381	308	80.0	14.6	4.8	083	0.0	GC
Atlantic	561	466	82.7	11.8	5.7	092	15.0	G
B9792-157	450	378	84.1	8.1	6.4	079	20.0	G
Norchip (CAN)	407	332	81.5	7.4	5.8	086	0.0	K, G
Denali	470	376	79.6	8.6	6.8	094	0.0	GC, G
E57-13	563	424	74.9	18.8	4.1	085	5.0	G
E55-35	419	332	79.2	19.0	4.1	104	0.0	G
Gemchip	536	409	76.2	11.3	5.4	081	4.0	G
MN12171	419	298	71.1	14.8	6.0	097	6.7	K, G
ND398	447	323	72.8	17.0	4.3	081	0.0	GC, G
ND01496-1	484	379	78.3	12.8	5.1	095	5.0	G
Norchip	555	391	70.8	13.3	4.8	086	0.0	K, G
Steuben	482	379	77.5	17.4	4.6	073	1.0	GC, G
W842	459	360	78.9	11.5	5.4	094	11.0	G
Snowden	535	456	84.7	12.9	4.8	094	0.0	G
LaBelle	539	449	83.3	4.6	8.2	086	0.0	GC, G
Wischip	406	329	81.7	9.9	5.3	079	0.0	G
LSD, .01	114	116	NS	7.9	1.6	009	10.8	-

^{1/} 1. omitted; measured October 12, air-water method.

^{2/} HH = hollow heart.

^{3/} Major defects accounting for percent culls (% US #1 - % <2"), K = knobs, GC = growth cracks, G = green.

Oregon Table 2B. Average Fry Color and Sprout Growth for 20 Chipping Selections Grown at Corvallis, Oregon. 1990.

Entry	Fry Color ^{1/}						Sprout Length, in ^{2/}					
	50°F			40°F			50°F			40°F		
	10/12	12/11	2/15	4/18	12/11	2/15	12/11	2/15	4/18	12/11	2/15	4/18
AC80545-1	2.5	2.0	3.2	2.0	3.5	4.5	0.2	1.2	8.7	-	0.2	0.5
AF875-15	2.2	1.7	3.2	3.1	3.4	4.1	0.6	14.7	24.0	-	0.5	5.0
AF875-16	2.5	1.6	3.1	2.4	2.7	3.1	0.3	8.5	10.0	-	0.2	0.6
AF1203-5	2.5	2.5	3.2	3.0	4.6	4.9	0.5	10.6	14.5	-	0.5	3.5
Atlantic	2.6	2.2	3.1	2.5	3.2	4.1	0.2	5.5	14.5	-	0.6	2.0
B9792-157	2.2	2.0	3.4	2.2	3.0	3.7	0.2	5.5	13.0	-	0.4	1.0
Norchip (CAN)	2.7	2.2	3.1	2.0	3.2	3.5	0.5	2.7	6.3	-	0.4	1.7
Denali	2.9	2.5	3.6	2.1	3.5	4.4	0.4	4.9	12.0	-	0.3	1.2
E57-13	2.1	1.7	2.7	1.5	3.1	3.0	0.0	1.6	12.0	-	0.1	0.3
E55-35	2.4	2.1	3.2	1.9	3.6	3.5	0.2	1.1	4.7	-	0.2	0.5
Gemchip	2.5	2.4	3.0	2.0	3.6	4.1	0.0	0.9	8.0	-	0.2	1.0
MN12171	2.2	2.0	3.1	3.3	3.8	4.2	0.9	10.7	24.0	-	0.6	2.7
ND398	2.7	2.2	2.7	1.7	3.9	4.5	0.6	4.1	11.5	-	0.3	0.6
ND01496-1	1.9	1.7	2.6	1.4	2.4	3.1	0.4	8.2	12.5	-	0.2	2.0
Norchip	2.6	2.5	2.9	2.2	3.6	4.1	0.4	2.7	9.0	-	0.4	1.2
Steuben	2.2	2.0	2.9	2.0	3.0	3.7	0.5	5.2	16.5	-	0.4	2.0
W842	2.2	2.0	3.2	2.0	2.5	2.4	0.5	8.2	13.5	-	0.2	0.9
Snowden	2.1	1.9	3.0	2.0	3.4	2.9	0.5	6.6	12.0	-	0.3	2.0
LaBelle	2.5	2.5	2.9	2.1	3.7	4.0	0.3	2.7	10.5	-	0.6	3.7
Wischip	2.2	1.9	3.0	1.9	3.4	3.4	0.5	7.7	14.0	-	0.3	1.2
LSD, .05	0.5	0.6	NS	0.6	0.6	0.9	0.4	3.4	4.9	-	0.3	1.2

^{1/} Tubers held at ambient temperatures through October 12; color ratings based on PC/SFA Color Chart (50 = very dark).

^{2/} Average estimated lengths of apical sprouts.

Oregon Table 3A. Average Yield, Grade, Specific Gravity, and Tuber Characteristics of 19 Chipping Selections Grown on a Commercial Farm at Jefferson, Oregon. 1990.

Entry	Yield, cwt/A		Percent		Oz/ Tuber	Spec. ^{1/} Grav.	% HH ^{2/}	External ^{3/} Defects
	Total	US #1	US #1	<4 oz				
AC80545-1	700	378	51.9	6.8	8.5	78	3.6	K, GC, G
AF875-16	411	348	84.7	11.1	4.8	87	6.7	G
AF875-15	552	485	87.9	7.2	5.9	78	0.0	GC, G
AF1203-5	351	276	78.5	16.1	4.1	74	0.0	GC
Atlantic	590	518	87.6	8.5	5.9	79	37.8	G
B9792-157	526	468	89.0	5.1	7.6	70	39.7	GC, G
Denali	400	319	78.7	8.7	7.1	83	1.9	GC, G
E55-35	522	405	76.3	21.8	3.9	88	9.4	G
E57-13	475	410	86.5	11.3	5.2	63	34.5	G
Gemchip	563	468	83.5	10.4	6.1	69	2.5	G
LaBelle	568	489	86.0	3.8	9.6	70	0.0	G
Minn12171	439	328	74.7	18.5	5.2	79	42.9	K, G
ND398	575	464	80.7	10.6	5.3	71	4.7	GC, G
Norchip	453	327	70.7	20.1	3.9	73	0.0	GC, G
Norchip (CAN)	462	339	73.6	8.1	5.7	77	1.8	GC, G
Steuben	473	427	90.3	6.9	6.2	59	0.0	GC, G
W842	441	385	87.1	8.1	6.1	86	0.0	G
Snowden	658	597	90.6	6.0	6.0	78	5.4	G
Wischip	498	434	86.8	8.1	6.1	64	0.0	GC, G
LSD, .01	110	119	13.0	6.3	1.3	12	NS	-
LSD, .05							29.3	

^{1/} 1.0 omitted; measured October 12, air-water method.

^{2/} HH - hollow heart.

^{3/} Major defects accounting for percent culls (% US %1 - % < 2"); K = knobs, GC = growth cracks, G = green.

Oregon Table 3B. Average Fry Color and Sprout Growth for 19 Chipping Selections Grown on a Commercial Farm at Jefferson, Oregon. 1990.

Entry	Fry Color ^{1/}						Sprout Length, in ^{2/}					
	50°F			40°F			50°F			40°F		
	10/12	12/11	2/27	4/12	12/11	2/27	4/12	12/11	2/27	4/12	12/11	2/27
AC80545-1	2.2	2.2	2.1	1.7	4.0	4.4	3.7	0.1	1.6	6.0	0.0	0.2
AF875-16	1.8	1.8	2.0	2.3	3.2	3.2	3.2	0.3	2.5	5.0	0.0	0.2
AF875-15	2.0	2.5	2.6	2.9	3.5	4.4	3.7	0.5	13.7	10.7	0.2	0.9
AF1203-5	2.1	2.7	3.1	3.4	4.6	5.0	4.6	0.8	8.0	13.5	0.2	0.6
Atlantic	1.9	2.2	2.2	2.0	3.5	4.4	3.7	0.2	3.1	7.5	0.0	0.4
B9792-157	1.7	2.0	2.7	2.7	3.1	4.2	3.6	0.4	2.4	6.5	0.0	0.4
Denali	2.5	2.5	2.6	1.9	3.7	4.5	3.6	0.3	2.5	7.2	0.0	0.3
E55-35	2.1	2.0	2.2	1.6	3.2	3.6	3.0	0.1	1.1	3.5	0.0	0.2
E57-13	1.9	2.0	2.0	1.6	2.9	3.4	2.9	0.0	3.1	13.5	0.0	0.2
Gemchip	2.4	2.5	2.6	2.7	3.4	4.5	3.9	0.2	4.9	13.5	0.0	0.5
LaBelle	2.4	2.6	2.7	2.2	4.0	4.5	4.1	0.7	2.1	4.2	0.3	0.4
MN12171	1.7	2.4	2.7	2.6	3.9	4.9	4.0	0.9	9.0	14.0	0.3	0.6
ND398	2.5	2.5	2.4	2.1	3.7	4.1	3.7	0.6	2.5	5.2	0.1	0.4
Norchip	2.1	2.7	2.5	2.0	4.0	4.6	4.0	0.3	3.6	8.7	0.0	0.4
Norchip (CAN)	1.9	2.5	2.4	2.5	4.2	4.6	4.1	0.4	2.2	7.7	0.2	0.4
Steuben	1.9	2.2	2.1	1.9	3.5	4.1	2.9	0.6	6.9	13.0	0.1	0.5
W842	1.9	2.2	2.1	1.9	2.6	3.4	3.1	0.4	3.1	7.0	0.0	0.3
Snowden	1.5	2.0	2.2	1.5	2.9	2.7	2.4	0.3	2.0	5.7	0.0	0.5
Wischip	1.7	2.1	2.2	1.9	3.5	4.4	3.5	0.6	5.6	11.0	0.1	0.5
LSD, .01	0.7	0.4	0.5	0.7	0.6	0.6	0.7	0.4	6.0	5.3	NS	1.4
LSD, .05											NS	0.3

^{1/} Tubers held at ambient temperatures through October 11, color ratings based on PC/SFA Color Chart (5.0 = very dark).

^{2/} Average estimated lengths of apical sprouts.

Oregon Table 4. Average Performance of 10 Russet Varieties at Corvallis, Oregon. 1990.

Entry	Yield, Total	Cwt/A US #1	Percent US #1 <2"	oz/ Tuber	%1/ HH	2/ Spec. Grav.	3/ Sprout Length, in						4/ Ext. Def.
							50°F						
							12/11	2/6	4/6	12/11	2/6	4/6	
Ranger Rus.	457	344	75	16	6.5	0	0.1	1.9	8.0	-0-	0.2	1.0	K, GC
A81323-6	483	383	79	18	5.6	4	0.2	1.4	5.2	-0-	0.3	1.1	K, GC, G
A81473-2	443	398	90	5	8.1	1	-0-	0.4	2.7	-0-	0.2	0.2	GC, G
A082281-1	374	324	86	13	6.0	19	-0-	0.5	7.7	-0-	0.2	0.4	K, G
A74212-1L	473	371	78	15	6.6	4	0.1	0.4	2.0	-0-	0.2	0.4	K, GC, G
CO08014-1	512	469	91	7	6.6	1	0.2	1.1	6.0	-0-	0.4	1.0	K, GC
Frontier	407	370	91	7	7.3	2	0.1	0.6	3.2	-0-	0.2	0.4	G
A74212-1E	594	458	77	14	6.4	1	0.2	1.6	5.0	-0-	0.2	0.5	K, GC
R. Burbank	549	379	69	17	6.5	5	-0-	0.4	10.5	-0-	0.2	0.2	K, GC
R. Norkotah	493	420	84	11	7.1	3	-0-	0.9	4.7	-0-	0.2	0.6	K, G
LSD, .01	105	NS	11	7	NS	11	0.2	0.7	2.3	-0-	NS	0.5	
LSD, .05		88			1.2						NS		

1/ HH = hollow heart.

2/ October 12, water-air method.

3/ Average estimated length of apical sprout.

4/ Major defects accounting for percent culls (% US #1 - % <2"). K = knobs, GC = growth cracks, G = green.

Oregon Table 5. Average Yield, Specific Gravity, Tuber Weight, Tuber Defects, Skin Set and Fry Color for Early-harvested Chipping Selections Grown on a Commercial Farm Near Hermiston, Oregon. 1990.

Entry	Yield, cwt/A		Oz/ Tuber	Spec. ^{2/} Grav.	Chip ^{3/} Color	Int. Defects ^{4/}		ED, ^{5/} major	Skin ^{6/} Set
	Total	US #1				Total, %	major		
AC83306-1	872	756	6.1	71	1.1	20	VD	GC	1.2
ND2008-2	404	293	4.2	61	1.0	3	-	GC, Sh	2.5
NDA2031-2	757	465	3.6	66	1.2	4	-	S	1.0
NDO1496-1	588	447	4.7	74	1.1	0	-	GC	1.0
Atlantic	650	549	5.2	77	1.0	60	BC, HH	G	3.0
Gemchip	589	494	6.0	67	1.0	2	-	GC, Sh	1.2
Norchip	350	233	3.6	67	1.2	3	-	GC	4.0

^{1/} Planted March 3, harvested August 2.

^{2/} Air-water method; 1.0 omitted.

^{3/} Color ratings based on PC/SFA Color Chart; 1 = light, 5 = dark.

^{4/} Major internal defects; BC = brown center, HH = hollow heart, VD = vascular ring discoloration.

^{5/} ED = major external defects; G = greening, GC = growth cracks, S = scab, Sh = tuber shape.

^{6/} 1 = poor, 3 = moderate, 5 = good.

Oregon Table 6. Average Yield, Specific Gravity, Tuber Weight, Tuber Defects, and Skin Set for Early-harvested Russets Grown on a Commercial Farm near Hermiston, Oregon. 1990^{1/}

Entry	Yield, cwt/A		Oz/ Tuber	Spec. ^{2/} Grav.	Average Rating ^{3/}						
	Total	US #1			SC	RUS	TS	ED	GC	SU	SS
A74212-1E	576	471	7.4	75	4.0	2.8	2.2	4.2	4.2	3.8	4.2
A082281-1	465	372	5.9	81	5.0	5.0	3.5	5.0	4.8	3.8	5.0
A74212-1L	541	347	6.2	78	4.0	3.0	5.0	4.0	3.8	5.0	4.2
Frontier	394	309	5.3	76	4.0	3.2	2.8	4.0	4.8	4.0	4.5
R. Norkotah	490	417	6.3	69	4.0	3.1	4.0	4.0	4.5	4.2	5.0
HiLite	415	302	4.4	76	4.0	3.0	3.0	4.5	5.0	3.5	5.0
Norgold M	575	466	5.9	68	4.0	3.0	2.2	4.5	4.2	3.5	4.8
Golden Russ.	339	194	3.5	72	4.0	3.2	3.0	4.5	5.0	4.0	5.0

^{1/} Planted April 3, harvested August 14.

^{2/} Air-water method, 1.0 omitted.

^{3/} SC = skin color (4.0 = brown, 5.0 = dark brown); RUS = russetting (1 = none, 5 = heavy); TS = tuber shape (1 = round, 3 = oblong, 5 = long); ED = eye depth (1 = deep, 5 = shallow); GC = growth cracks (1 = severe, 5 = none); SU = tuber shape uniformity (1 = variable, 5 = uniform); SS = skin set (1 = poor, 5 = good).

Oregon Table 7. Average Yield, Specific Gravity, Tuber Weight, Tuber Defects, Skin Set, and Fry Color for Ten Late-harvested Russets Grown on a Commercial Farm Near Hermiston, Oregon. 1990.^{1/}

Entry	Yield, cwt/A		Oz/ Tuber	Spec. ^{2/} Grav.	Fry ^{3/} Color	SE, ^{4/} %	Int. Def. ^{5/}		External ^{6/} Defects
	Total	US #1					Total, %	major	
A74212-1E	885	808	9.7	71	1.5	18	43.0	VD, IBS	O, LR
Ranger Rus.	836	671	12.4	84	0.6	0	31.0	VD	DE
A81727-6	760	628	8.1	85	0.4	2	8.9	-	R-O
A082611-7	749	437	7.8	84	0.1	0	11.2	-	GC
A083037-10	852	775	12.0	74	0.2	0	62.0	IBS, VD	R-O
CO08014-1	713	607	8.2	73	0.6	5	54.0	IBS	R-O, DE
A082281-1	825	655	11.1	83	0.9	2	11.0	-	O
Century	998	736	11.8	68	1.9	35	73.0	VD	LR
R. Burbank	864	490	12.5	76	1.3	20	41.7	IBS, VD	GC
Frontier	387	320	5.8	72	1.0	20	37.3	IBS	LR, R-O, DE

^{1/}Planted April 11, harvested October 1.

^{2/}Air-water method, 1.0 omitted.

^{3/}USDA Color Chart for French Fries, 0 = light, 4 = dark.

^{4/}SE = sugar- or dark-end fries.

^{5/}Internal defects; IBS = internal brown spot; VD = vascular discoloration.

^{6/}DE = deep eyes; GC = growth cracks; LR = light russetting; O = oblong shape;
R-O = round-to-oblong shape.

Oregon Table 8. Average Yield, Tuber Size, Specific Gravity, Fry Color, Percent Sugar-End Fries, and Internal Defects for 10 Russets Grown on a Commercial Farm Near Hermiston, Oregon. 1990.^{1/}

Entry	Yield, cwt/A		Oz/ Tuber	Spec. ^{2/} Grav.	Fry ^{3/} Color	SE, ^{4/} %	Int. Def. ^{5/}		External ^{6/} Defects
	Total	US #1					Total, %	major	
A74212-1E	844	696	6.4	78	1.4	12	9.5	-	R-O, LR
Ranger Rus.	842	691	8.4	94	0.5	0	12.0	BS	DE
A81727-6	497	339	4.8	92	0.1	0	1.7	-	R
A082611-7	805	549	5.5	86	0.3	0	10.1	BS	GC
A083037-10	927	818	7.7	80	0.5	0	17.0	-	R-O
CO08014-1	779	610	5.6	80	0.0	0	1.4	-	R, DE
A082281-1	893	779	7.6	84	0.7	0	17.9	BS	R-O
Century Rus.	1061	915	9.7	73	1.8	40	35.0	VD	LR
R. Burbank	645	336	5.0	72	1.2	8	60.0	BC, HH	DE
Frontier Rus.	324	193	3.5	70	0.6	8	13.3	VD	LR

^{1/}Planted April 18, harvested September 28.

^{2/}Air-water method; 1.0 omitted.

^{3/}USDA Color Chart for French Fries; 0 = light, 4 = dark.

^{4/}SE = sugar-end or dark-end fries.

^{5/}Percent of tubers with internal defects, including: BC = brown center, HH = hollow heart, BS = blackspot bruise, VD = vascular discoloration.

^{6/}DE = deep eyes; GC = growth cracks; LR = light russet; R = round tuber shape;
R-O = round-oblong.

Texas

J. Creighton Miller, Jr. and Douglas G. Smallwood

Variety Development and Testing

Seedling Program. Approximately 48,000 first-year seedlings representing 251 families were grown for selection near Springlake in 1990 and 86 original selections were made from this material. The 1990, first-year seedlings from Texas resulted from crosses made at the Texas Agricultural Experiment Station near Lubbock during the winter of 1988-89. The remainder were obtained from Joe Pavek in Idaho (14,562), Bob Johansen in North Dakota (15,080) and David Holm in Colorado (8,161). The Texas program also supplied the North Dakota, Idaho, and Colorado programs with second, third and fourth size seedling tubers for selection.

Adaptation Trials. The 1990 growing season was marked by above average temperatures in June and below average temperatures in July. In general, vine growth was above average, with total yields near average. Tuber growth in June was minimal due to extreme heat, which delayed tuber bulking. However, the mild temperatures in July promoted tuber bulking and higher than normal specific gravities. The variety and advanced selection trials at Springlake were planted on March 28 and harvested on August 21. Thirty-two russet varieties or advanced selections were tested for their adaptability to Texas conditions (Table 1). The outstanding entry based on total yield and general rating was Century Russet. However, approximately forty percent of the total yield consisted of tubers which were under four ounces and/or below grade. This variety has potential to produce very high total yield, but appears to be affected by adverse environmental conditions such as extreme heat. The performance of Russet Norkotah was very disappointing in this trial. Based on general rating, the entries NDTX 9-1069-4 Ru, Norgold #35, TX 716 (Norgold #40 selection), Norgold #19, ATX 6-84378-1 Ru (CO and ND seed sources), Krantz, CO 81082-1 and TXND 329-1 deserve mention. A number of entries including A 7411-2, TX 729 (Norgold #40 selection), Norgold #19 and Norgold #40 performed quite well in terms of total yield; however, they produced a large percentage of below grade tubers. The entry ATX 6-84378-1 Ru from Colorado and North Dakota seed sources did quite well in terms of general rating and produced a significantly higher percentage of over 10 oz. U.S. No. 1 grade potatoes. This entry has potential to become a new variety. The specific gravities of all entries were extremely high for Texas grown potatoes, possibly due to the cool July temperatures. The outstanding white entry based on total yield was the check variety Atlantic (Table 2). The variety Gemchip deserves mention based on general rating. The performance of AC 80545-1 was disappointing this year since it has shown promise in earlier trials. The outstanding red entries based on total yield and general rating were Red LaSoda, Viking #17, LA 12-59, Viking and NDTX 9-1068-11 R. The yield of the latter variety was somewhat lower than in previous years. Other red entries deserving mention based on general rating include ND 1618-13 R, Viking #7, NDTX 7-3406-4 R and ATX 6-84650-4 R. Viking #7 and Viking #17 produced significantly higher percentages of over 10 ounce size U.S. No. 1 potatoes than all other entries, with the exception of Red LaSoda.

In 1989, we undertook a new initiative which resulted in the selection of 375 subclonal variants of Russet Norkotah from two diverse locations. The objective of this initiative was to develop superior Russet Norkotah strains which possess stronger vines to resist environmental stresses such as hail and hot, desiccating winds. These selections were selected based on vine growth habits. In 1990, the selections were tested in Texas at two locations, and selections was based primarily on tuber characteristics. Table 3 contains the results from a trial which consisted of seventeen Russet Norkotah strain selections, as well as Russet Norkotah and Norgold "M". In general, the strains outperformed both check varieties. The outstanding entries based on general rating included Russet Norkotah #17, #8, #22, #7, #6-0, #1, #10, #21, #14, #12 and #9, with #22 scoring best over all.

The advanced selection trial (Table 4) consisted of nine advanced selections made at Springlake in 1986, resulting from crosses made in Idaho and Texas. The outstanding entries based on total yield and general rating were Red LaSoda, TX 6-1229-6 W, Viking, Atlantic, ATX 6-84378-1 Ru, TX 6-1231-1 W and TX 6-1229-2 Ru. The strip trial at Springlake consisted of nine potato varieties or strain selections and seven promising advanced selections for which sufficient seed was available for strip planting of 300 foot rows (Table 5). Strip trials closely duplicate grower conditions and represent a more advanced phase of testing than replicated variety trials. On September 12, four randomly selected plots of each entry were harvested. The outstanding entries based on total yield and general rating were Century Russet, A 74212-1E, NDTX 9-1069-4 Ru, Viking and Red LaSoda. Based on total yield of U.S. No. 1 tubers and general rating, ATX 6-84378-1 Ru (ID and TX seed sources) and Russet Norkotah were also outstanding. Other entries deserving mention based on general rating include Norgold "M", NDTX 9-1068-11 R and Krantz. The strain selection A 74212-1E produced excellent yields; however, it did produce a significantly higher yield of culls/No. 2 grade potatoes than all other entries. Other entries which produced some tubers of low quality grade included Norgold "M", Century Russet, ATX 6-84378-1 Ru, Russet Norkotah and ND 1538-1 Ru. The performance of NDTX 9-1069-4 Ru was substantially better than in previous years. This selection produced a high yield of uniform tubers in the four to ten ounce range, with a small percentage of low grade tubers. The variety Gemchip produced a high yield of uniform tubers. In general, tubers produced by Gemchip were slightly larger than those produced by Atlantic. The performance of ND 671-4 Ru, ND 1538-1 Ru, AC 80545-1 and Russet Nugget was poor.

Summarizing results of all trials at Springlake, the most promising varieties or advanced selections were NDTX 9-1069-4 Ru, ATX 6-84378-1 Ru, TX 6-1229-2 Ru, CO 8011-5, A 74212-1E, Century Russet, TX 6-1229-6 W, Viking #17, LA 12-59 and ATX 6-84706-2 Ru. Several of the Russet Norkotah strain selections show promise, including Russet Norkotah #1 and #22. The strain selections are in the early test phase and more testing is

needed. Additional testing of these, as well as approximately 56 other Russet Norkotah strain selections will continue in 1991. Century Russet continues to show promise for the Texas High Plains; however, the extreme heat adversely affected tuber formation in this variety. Additional information is needed regarding cultural practices specific to Texas-New Mexico growing conditions. Norgold "M" continues to be the most consistent performer of the Norgold Russet strains.

Texas Table 1. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 31 russet potato varieties or advanced selections grown at Springlake, Texas - 1990.

Variety or Selection	TOTAL YIELD CWT/A	U.S.No.1 CWT/A		Average Tuber Weight in oz.	Specific Gravity	Tuber Type	Skin Type	General Rating 1/ 1
		Total Yield	Over 10 oz.					
Century Russet	469.5	263.3	26.1	4.7	1.077	Oblong	Russet	3.3
NDTX 9-1069-4 Ru	335.9	197.1	24.5	4.3	1.084	Long	Russet	3.3
A 7411-2	327.5	176.8	20.7	3.8	1.091	Long	Russet	3.0
AC 75430-1	322.7	163.3	0.0	3.6	1.084	Oblong	Russet	2.9
Norgold #35	315.6	146.8	12.9	3.6	1.081	Oblong	Russet	3.2
TX 716	315.2	119.7	5.2	3.5	1.079	Oblong	Russet	3.1
TX 729	299.1	112.9	4.5	3.4	1.070	Oblong	Russet	3.0
TX 715	291.0	132.0	7.4	3.2	1.077	Oblong	Russet	2.9
Norgold #19	285.6	111.3	5.5	3.5	1.074	Oblong	Russet	3.1
ATX 6-84388-2 Ru	280.4	110.4	7.7	3.3	1.080	Oblong	Russet	3.0
Cal-Ore	279.1	167.1	14.2	4.0	1.089	Oblong	Russet	2.9
Norgold #40	244.6	100.3	0.0	3.5	1.087	Long	Russet	2.6
Lemhi	226.8	157.5	19.4	4.9	1.091	Long	Russet	3.1
ATX 6-84510-2 Ru	224.9	80.7	5.5	3.0	1.084	Oblong	Russet	2.9
ATX 6-84378-1 Ru (CO)	224.9	173.9	91.0	7.2	1.081	Oblong	Russet	4.2
Krantz	223.9	122.3	2.6	4.2	1.084	Oblong	Russet	3.3
CO 81082-1	216.8	102.6	0.0	4.0	1.084	Oblong	Russet	3.2
Mn 13653	216.5	90.7	0.0	3.5	1.080	Oblong	Russet	2.7
Norgold "M"	205.2	67.4	0.0	3.2	1.073	Oblong	Russet	2.8
Russet Nugget	202.6	88.4	0.0	3.4	1.092	Oblong	Russet	2.9
ATX 6-84378-1 Ru (ND)	196.2	156.8	72.9	6.7	1.085	Oblong	Russet	3.7
CO 81095-1	196.2	116.5	5.2	4.0	1.089	Oblong	Russet	3.0
Frontier Russet	194.6	83.6	7.1	3.3	1.087	Oblong	Russet	2.9
ND 671-4 Ru	194.2	65.5	1.9	3.1	1.081	Oblong	Russet	2.9
TXND 329-1	192.6	104.5	2.3	4.8	1.079	Oblong	Russet	3.1
ATX 6-84026-2 Ru	177.5	49.7	2.6	2.9	1.078	Oblong	Russet	2.4
ND 1538-1 Ru	166.2	73.6	2.9	3.6	1.083	Oblong	Russet	2.9
TX 6-1216-1 Ru	162.3	37.8	0.0	2.5	1.082	Oblong	Russet	2.2
Russet Norkotah	155.2	80.0	0.0	3.7	1.072	Oblong	Russet	2.6
ND 2358-20 Ru	143.6	74.9	0.0	3.6	1.078	Oblong	Russet	2.3
ND 2667-9 Ru	108.4	48.4	1.9	3.3	1.074	Oblong	Russet	2.5
Mn 10874	103.3	20.0	0.0	2.2	1.082	Oblong	Russet	1.7
Average	234.3	112.4	10.7	3.8	1.082			2.9
L.S.D. (.05)	104.2	71.3	27.5	1.1				

1/ 1 = very poor to 5 = excellent

Texas Table 2. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 17 red and white potato varieties or advanced selections grown at Springlake, Texas - 1990.

Variety or Selection	TOTAL YIELD CWT/A	U.S.No.1 CWT/A		Average Tuber Weight in oz.	Specific Gravity	Tuber Type	Skin Type	General Rating 1/
		Total Yield	Over 10 oz.					
Red LaSoda	452.4	283.9	38.1	4.1	1.059	Oblong	Red	2.8
Viking #17	392.4	319.4	55.8	6.2	1.066	Oblong	Red	3.5
LA 12-59	384.6	227.8	14.2	4.2	1.071	Oblong	Red	3.3
Atlantic	362.7	182.3	2.6	3.7	1.082	Round	White	2.9
Viking	348.5	265.6	3.2	5.5	1.066	Oblong	Red	3.5
Redsen B	326.5	211.7	10.6	4.5	1.061	Oblong	Red	3.1
ND 2225-1 R	326.2	69.7	0.0	2.7	1.061	Round	Red	3.0
NDTX 9-1068-11 R	325.6	185.9	15.8	3.9	1.062	Oblong	Red	3.5
ND 1618-13 R	309.1	187.5	8.4	4.6	1.062	Oblong	Red	3.3
Dark Red Norland #13	305.2	183.0	5.8	4.4	1.064	Oblong	Red	3.0
Gemchip	288.5	172.6	8.1	4.2	1.068	Oblong	White	3.3
Viking #7	287.5	243.9	84.9	6.9	1.068	Oblong	Red	3.6
NDTX 7-3406-4 R	282.3	158.4	22.6	4.2	1.061	Oblong	Red	3.3
Chieftain	274.9	117.5	2.9	3.4	1.064	Oblong	Red	2.8
ATX 6-84650-4 R	272.7	168.1	14.8	4.4	1.061	Oblong	Red	3.2
Redsen Select	256.8	119.7	2.9	3.7	1.066	Round	Red	2.6
AC 80545-1	190.4	71.3	0.0	3.1	1.067	Round	White	2.3
Average	316.8	186.4	17.1	4.3	1.065			3.1
L.S.D. (.05)	108.6	79.2	29.1	0.7				

1/ 1 = very poor to 5 = excellent

Texas Table 3. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 17 Russet Norkotah strain selections, as well as Russet Norkotah and Norgold "M", grown at Springlake, Texas - 1990.

Variety or Selection	TOTAL YIELD CWT/A	U.S.No.1 CWT/A		Average Tuber		Specific Gravity	Tuber Type	Skin Type	General Rating 1/
		Total Yield	Over 10 oz.	Weight in oz.					
Russet Norkotah #17	294.6	169.4	18.1	4.1		1.085	Long	Russet	3.2
Russet Norkotah #3	293.3	204.6	34.2	4.9		1.079	Long	Russet	3.0
Russet Norkotah #8	291.0	193.3	31.6	5.1		1.080	Oblong	Russet	3.3
Russet Norkotah #22	271.0	206.8	66.8	5.5		1.077	Long	Russet	3.7
Russet Norkotah #7	262.0	165.5	11.9	4.0		1.079	Oblong	Russet	3.3
Russet Norkotah #6-0	233.0	128.4	18.7	4.3		1.071	Long	Russet	3.2
Russet Norkotah #1	233.0	155.8	18.4	4.8		1.082	Long	Russet	3.7
Russet Norkotah #10	229.1	142.3	11.6	4.4		1.079	Oblong	Russet	3.3
Russet Norkotah #6	221.3	115.2	7.4	4.0		1.069	Long	Russet	2.9
Russet Norkotah #21	216.5	143.9	11.9	4.7		1.083	Long	Russet	3.3
Russet Norkotah #14	215.2	151.7	19.0	4.7		1.084	Long	Russet	3.3
Russet Norkotah #12	214.6	159.7	27.1	5.1		1.074	Long	Russet	3.5
Russet Norkotah #24	206.2	105.5	1.9	4.0		1.073	Oblong	Russet	3.0
Norgold "M"	205.2	67.4	0.0	3.2		1.073	Oblong	Russet	2.8
Russet Norkotah #9	199.1	145.2	9.7	4.5		1.080	Oblong	Russet	3.2
Russet Norkotah #13	177.8	102.0	4.2	4.2		1.074	Oblong	Russet	3.0
Russet Norkotah #20	156.8	67.8	0.0	3.1		1.084	Long	Russet	2.2
Russet Norkotah	155.2	80.0	0.0	3.7		1.072	Oblong	Russet	2.6
Russet Norkotah #5	144.9	70.3	0.0	2.9		1.082	Long	Russet	2.0
Average	222.1	135.5	15.4	4.3		1.078			3.1
L.S.D. (.05)	73.7	60.0	37.0	0.9					

1/ 1 = very poor to 5 = excellent

Texas Table 4. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 9 Idaho-Texas and Texas advanced selections (Texas seed) and 4 check varieties of potatoes grown at Springlake, Texas - 1990.

Variety or Selection	TOTAL YIELD CWT/A	U.S.No.1 CWT/A		Average Tuber		Specific Gravity	Tuber Type	Skin Type	General Rating 1/
		Total Yield	Over 10 oz.	Weight in oz.					
Red LaSoda	403.5	178.3	5.3	4.1	1.072	Oblong	Red		3.5
TX 6-1229-6 W	367.5	253.0	32.3	5.8	1.061	Oblong	White		3.6
Viking	319.8	229.4	39.0	5.5	1.074	Oblong	Red		3.2
Atlantic	312.7	93.3	0.0	3.5	1.078	Round	White		2.9
ATX 6-84378-1 Ru	309.1	229.4	34.8	5.8	1.073	Oblong	Russet		4.1
TX 6-1231-1 W	304.6	218.4	61.0	6.4	1.067	Oblong	White		3.3
Norgold "M"	286.2	82.0	0.0	3.3	1.065	Oblong	Russet		2.9
TX 6-1229-2 Ru	282.7	234.9	102.9	7.2	1.072	Oblong	Russet		3.9
TX 6-1260-1 W	260.7	90.0	0.0	3.8	1.056	Oblong	White		3.0
TX 6-1247-1 P	249.1	110.0	0.0	4.4	1.068	Oblong	Purple		3.0
TX 6-1253-3 W	228.8	101.0	0.0	4.0	1.072	Oblong	White		3.0
ATX 6-84516-1 Ru	196.5	132.3	21.3	4.6	1.069	Oblong	Russet		3.3
ATX 6-84650-4 R	139.9	41.5	0.0	3.4	1.064	Oblong	Red		3.1
Average	281.6	153.3	22.8	4.8	1.069				3.3
L.S.D. (.05)	63.6	55.0	36.6	1.1					

1/ 1 = very poor to 5 = excellent

Texas Table 5. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 16 potato varieties or advanced selections grown in a strip trial at Springlake, Texas - 1990.

Variety or Selection	TOTAL YIELD CWT/A	U.S.No.1 CWT/A		Average Tuber Weight in oz.	Specific Gravity	Tuber Type	Skin Type	General Rating 1/
		Total Yield	Over 10 oz.					
Century Russet	465.1	297.5	34.6	4.9	1.063	Long	Russet	3.3
A 74212-1 E	426.6	214.8	19.0	4.5	1.063	Long	Russet	3.5
NDTX 9-1069-4 Ru	423.5	288.3	26.5	5.3	1.073	Oblong	Russet	3.3
Viking	403.1	172.6	0.0	4.1	1.066	Oblong	Red	3.3
Red LaSoda	361.5	266.2	32.1	5.9	1.068	Oblong	Red	3.3
Gemchip	332.7	143.3	7.8	3.9	1.063	Round	White	3.0
Norgold "M"	328.5	110.6	12.3	3.7	1.062	Oblong	Russet	3.2
Atlantic	311.8	90.8	0.0	3.5	1.078	Round	White	2.9
ATX 6-84378-1 Ru (ID)	284.1	223.8	68.7	6.7	1.066	Oblong	Russet	4.0
NDTX 9-1068-11 R	270.4	127.1	9.2	4.2	1.066	Oblong	Red	3.5
ATX 6-84378-1 Ru (TX)	246.4	169.3	46.1	5.6	1.064	Oblong	Russet	4.0
Krantz	240.8	131.9	5.3	4.1	1.069	Oblong	Russet	3.3
Russet Norkotah	227.4	167.1	20.1	5.2	1.067	Oblong	Russet	3.5
ND 671-4 Ru	218.2	74.3	6.1	3.3	1.063	Oblong	Russet	2.9
AC 80545-1	212.0	105.0	11.5	4.0	1.070	Round	White	2.3
ND 1538-1 Ru	165.1	44.4	0.0	3.6	1.061	Oblong	Russet	2.9
Russet Nugget	141.4	53.6	0.0	3.3	1.073	Long	Russet	2.9
Average	297.6	157.7	17.6	4.5	1.067			3.3
L.S.D. (.05)	89.5	77.7	37.6	0.7				

1/ 1 = very poor to 5 = excellent

VIRGINIA

S. B. Sterrett and C. P. Savage, Jr.

Introduction

The primary objective of these trials is to identify clones and new cultivars that combine high yield potential with acceptable internal and external tuber quality in Eastern Virginia. The trials were conducted at the Eastern Shore Agricultural Experiment Station, Painter, Virginia. Evaluations included marketable yield, size distribution, internal and external tuber quality, vine and tuber maturity, and processing potential. Replicated yield trials included 36 round white, 8 red skinned and 12 russeted cultivars or advanced numbered clones.

Methods

Trials were planted on March 15 in single-row plots on a Bojac sandy loam soil. Plots were 25 feet in length with 36 inches between rows and 12 inches between seedpieces. Trials were planted in a randomized complete block design with four replications. Fertilization included 100 lbs N, 43.7 lbs P, and 83 lbs K/A banded at planting, with 50 lbs N/A sidedressed 71 days later. Linuron (0.38 lbs ai/A) and Metolachlor (1.25 lbs ai/A) were applied at dragoff. Irrigation was not needed this year. Trials were harvested July 9. Specific gravity was determined by the weight-in-air/weight-in-water method. Chip evaluations were provided by Mr. Steve Molnar, Wise Foods, Berwick, PA. Samples were held at ambient air temperature and chipped 2, 7, and 11 days after harvest.

Results

After an early planting date, weather conditions were conducive to quick, uniform emergence. Rainfall was relatively even in distribution during most of the growing season. Cool temperatures in May were combined with 7.38 inches of rainfall (50-year average was 3.33 inches). In these studies, as well as in commercial fields, tuber yields were high, external defects were minimal, and internal heat necrosis was not a significant problem.

In the advanced round white trial, significantly higher yields were recorded for B9955-46 and B0554-1 than Superior. With acceptable tuber appearance, both clones have potential for fresh market although the late skin maturity of B9955-46 would limit production of this entry for early markets.

In the chipping trial, exceptional chip color was found for several entries. In addition to light chip color, the marketable yield and specific gravity of AF875-16 and B0256-1 were similar to Atlantic. Although marketable yield of B0209-1 was significantly higher than Atlantic, growth cracks in B0209-1 were excessive. The entry AF1203-5 was more susceptible than Atlantic to internal heat necrosis.

Marketable yield of Red Pontiac was significantly higher than the other red-skinned entries, but Reddale had the most attractive tubers. All entries were relatively free of internal and external defects.

Adequate tuber size for count boxes continues to be a problem with russets for this growing area. The entries B9922-11, B0303-30, B0425-5, and B0455-8 had the highest percentage of tubers over 8 oz. However, only B0455-8 combined acceptable tuber appearance, improved tuber size distribution, and freedom from internal and external defects.

Acknowledgements

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Virginia Table 1. Yield and size distribution of advanced round white clones - 1990.

Clone 1/	Yield		Marketable Yield		Size Distribution 2/				Specific 3/ Gravity	Days after Harvest		Chip Color 4/
	>1 1/2"	cwt/A	Percentage of Std.	cwt/A	1	2	3	4		3	7	
Ajax	280	148	89		45	35	20	0	1.079	6	7	8
Atlantic	231	141	84		36	27	34	3	1.099	2	3	3
Ausonia	277	168	101		38	34	28	0	1.083	3	4	6
Campbell 13	178	135	81		24	26	45	6	1.081	3	4	4
Nadine	263	126	75		51	28	21	0	1.065	8	8	9
Superior (Std)	232	167	100		23	31	45	1	1.089	4	3	5
B9955-46	257	204	122		20	20	55	4	1.087	2	3	1
B0176-24	253	182	109		24	21	48	7	1.093	2	4	5
B0178-30	289	199	119		30	28	39	3	1.099	2	4	2
B0178-34	254	184	110		20	24	48	8	1.103	2	3	3
B0178-35	285	192	115		33	26	29	3	1.102	3	5	4
B0241-8	284	191	114		25	24	49	2	1.084	3	5	3
B0347-4	207	140	84		30	33	34	3	1.078	3	3	4
B0554-1	286	221	132		23	21	46	10	1.090	3	5	4
B0566-5	249	148	89		41	29	29	0	1.086	2	-	2
B0595-1	228	146	87		32	29	39	0	1.072	3	4	3
B0610-6	245	195	117		20	17	53	11	1.083	2	3	3
ND651-9	269	148	89		23	31	45	1	1.084	2	2	3
ZPC81P110	301	208	125		26	24	45	5	1.075	-	-	-
Waller Duncan	40	36										
LSD (K=100)												

1/ Planted March 15, harvested July 9, 1990.

2/ Size distribution: 1 = 1-1/2" - 1-7/8", 2 = >1-7/8" - 2-1/2", 3 = >2-1/2" - 3-1/4", 4 = >3-1/4".

3/ Determined by weight in air/weight in water method.

4/ Unreplicated sample, 1-4 = acceptable, 5 = marginal, 6 or above = unacceptable.

Virginia Table 2. Yield and size distribution of round white clones with chip potential - 1990.

Clone ^{1/}	Total >1 1/2" cwt/A	Marketable Yield		Size Distribution ^{2/}				Specific ^{3/} Gravity	Days after Harvest ^{4/}	Chip Color
		cwt/A	Percentage of Std.	1	2	3	4			
Atlantic (Std)	275	190	100	29	30	39	2	1.092	2	2
Superior	275	208	109	36	27	34	3	1.087	4	6
AF875-15	251	185	97	25	24	49	3	1.090	2	3
AF875-16	247	191	101	21	25	51	3	1.096	1	2
AF879-3	216	104	55	52	33	15	0	1.089	3	3
AF1203-5	215	146	77	30	30	38	1	1.083	1	4
B0209-1	290	254	134	8	15	67	9	1.092	1	1
B0242-3	253	202	106	20	21	51	8	1.088	2	3
B0256-1	278	205	108	25	26	44	5	1.100	2	3
B0257-3	253	166	87	34	33	33	0	1.094	-	-
B0257-12	273	179	94	35	30	34	1	1.084	3	5
E11-45	292	162	85	44	29	28	0	1.077	2	3
E55-27	257	154	81	40	30	30	0	1.094	1	2
E55-44	273	178	94	35	38	26	0	1.085	2	1
F24-12	266	177	93	35	25	39	1	1.088	1	3
F100-1	246	153	81	38	32	31	0	1.096	1	1
FG6-15	209	121	64	40	34	25	1	1.079	2	4
Waller-Duncan	35	37								
LSD (K=100)										

1/ Planted March 15, harvested July 9, 1990.

2/ Size distribution: 1 = 1-1/2" - 1-7/8", 2 = >1-7/8" - 2-1/2", 3 = >2-1/2" - 3-1/4", 4 = >3-1/4".

3/ Determined by weight in air/weight in water method.

4/ Unreplicated sample, 1-4 = acceptable, 5 = marginal, 6 or above = unacceptable.

Virginia Table 3. Yield and size distribution of red-skinned clones - 1990.

Clone ^{1/}	Yield cwt/A	Marketable Yield		% of Total Yield ^{2/}				Specific ^{3/} Gravity
		cwt/A	Percentage of Std.	1	2	3	4	
Cherry Red	214	145	59	32	31	36	1	1.082
Norland	221	144	59	34	29	36	1	1.062
Red Cloud	151	105	43	39	19	39	3	1.074
Reddale	273	206	84	21	21	46	13	1.071
Red Gold	229	149	61	35	28	32	5	1.084
Red Pontiac (Std)	329	244	100	25	26	44	5	1.073
B0615-2	267	165	68	38	27	34	1	1.078
LA12-59	301	214	87	30	30	39	2	1.087
Waller-Duncan LSD (K=100)	58	53						

1/ Planted March 15, harvested July 9, 1990.

2/ Size distribution: 1 = 1-1/2" - 1-7/8", 2 = >1-7/8" - 2-1/2", 3 = >2-1/2" - 3-1/4", 4 = >3-1/4".

3/ Determined by weight in air/weight in water method.

Virginia Table 4. Yield and size distribution of advanced russet clones - 1990.

Clone ^{1/}	Yield cwt/A	Marketable Yield		Size Distribution ^{2/}				Specific Gravity ^{3/}
		cwt/A	Percentage of Std.	1	2	3	4	
BelRus (Std)	202	110	100	45	52	3	0	1.096
B9922-11	242	175	159	28	60	11	0	1.047
B0045-6	228	121	110	49	47	4	0	1.091
B0303-30	215	156	142	28	56	15	0	1.088
B0312-10	136	66	60	53	39	6	3	1.096
B0328-7	191	109	99	47	49	5	0	1.093
B0338-2	176	93	85	50	46	4	0	1.083
B0425-5	199	132	120	34	56	10	1	1.079
B0427-7	196	110	100	46	45	8	1	1.086
B0455-8	226	159	145	30	54	14	2	1.082
B0455-27	251	157	143	38	55	7	0	1.087
B0642-9	170	102	93	42	52	5	0	1.076
Waller Duncan LSD (K = 100)	71	54						

1/ Planted March 15, harvested July 9, 1990.

2/ Size distribution: 1 = <4 oz, 2 = >4-8 oz, 3 = >8-12 oz, 4 = >12-16 oz, 5 = >16 oz.

3/ Determined by weight in air/weight in water method.

Virginia Table 5. Vine and tuber characteristics and tuber defects - 1990

Clone	Vine Rating		Tuber Rating ^{1/}		Defects ^{2/}					
	Matu- rity	Pollu- tion	Shape	Appear.	Skin Mat.	Sun- burn	Second Growth	Growth Cracks	Heat #	Necrosis Rating
----- Advanced Round White Trial -----										
Ajax	6	9	3	6	7	9	7	9	0	9
Atlantic	7	9	2	6	6	9	9	6	3	7
Ausonia	7	8	4	5	7	9	9	5	1	8
Campbell 13	6	8	3	6	6	9	9	9	0	9
Nadine	6	8	3	5	7	6	9	6	7	7
Superior	5	9	4	6	8	7	8	6	0	9
B9955-46	6	7	3	6	5	9	9	9	0	9
B0176-24	6	9	3	6	7	9	5	9	0	9
B0178-30	7	9	3	7	5	9	9	9	0	9
B0178-34	6	9	3	6	7	9	9	6	1	8
B0178-35	8	8	3	7	6	9	9	9	1	7
B0241-8	7	8	3	7	5	9	9	4	0	9
B0347-4	6	5	3	7	7	9	9	9	2	8
B0554-1	4	6	2	8	8	9	9	8	0	9
B0566-5	5	7	2	7	7	7	9	9	1	8
B0595-1	6	6	4	7	6	7	9	9	0	9
B0610-6	6	6	3	6	8	9	9	9	1	7
ND651-9	5	6	2	7	7	9	9	4	0	9
ZPC81P110	8	8	4	4	4	9	6	9	13	7
----- Chipping Trial -----										
Atlantic	7	9	2	7	6	9	9	7	4	6
Superior	5	8	4	6	6	9	9	9	1	7
AF875-15	6	8	4	5	6	7	9	9	0	9
AF875-16	6	8	3	6	6	7	9	9	0	9
AF879-3	3	8	2	6	7	9	9	9	0	9
AF1203-5	4	8	2	7	6	9	9	7	10	7
B0209-1	5	8	3	5	5	9	7	6	1	8
B0242-3	4	8	3	5	6	9	9	6	3	6
B0256-1	7	8	3	7	6	9	9	9	1	7
B0257-3	5	7	2	7	6	9	9	9	0	9
B0257-12	5	7	3	7	7	9	9	9	1	8
E11-45	6	9	3	7	7	9	9	9	1	8
E55-27	5	8	2	7	7	9	9	9	0	9
E55-44	5	8	3	7	7	9	9	9	1	8
F24-12	6	8	2	7	7	9	9	9	0	9
F100-1	4	8	3	5	6	9	9	9	0	9
FG6-15	4	7	3	6	6	9	8	5	0	9

Virginia Table 5. Continued

Clone	Vine Rating		Tuber Rating ^{1/}		Defects ^{2/}					
	Matu- rity	Pollu- tion	Shape	Appear.	Skin Mat.	Sun- burn	Second Growth	Growth Cracks	Heat #	Necrosis Rating
Red Skinned Trial										
Cherry Red	6	9	3	6	7	9	9	9	0	9
Norland	4	2	3	6	8	9	9	9	1	8
Red Cloud	6	9	3	4	4	9	9	9	0	9
Reddale	5	8	3	7	6	9	9	8	0	9
Red Gold	4	9	3	6	7	9	9	9	0	9
Red Pontiac	6	8	3	5	5	9	9	9	0	9
B0615-2	5	7	3	6	6	9	9	9	0	9
LA12-59	6	8	3	6	6	9	9	9	0	9
Russet Trial										
BelRus	4	7	7	7	6	9	9	9	2	8
B9922-11	7	8	6	4	5	9	9	7	0	9
B0045-6	7	8	6	5	5	9	9	7	0	9
B0303-30	6	7	7	6	6	9	9	9	0	9
B0312-10	6	7	6	6	5	9	9	9	2	7
B0328-7	5	8	6	4	7	9	9	9	5	8
B0338-2	5	8	7	5	6	9	9	9	1	8
B0425-5	5	9	7	5	6	6	9	6	0	9
B0427-7	6	8	7	5	5	9	9	9	0	9
B0455-8	5	6	6	6	7	9	9	9	0	9
B0455-27	6	7	7	5	8	6	9	9	2	8
B0642-9	4	6	6	4	8	6	9	9	0	9

^{1/} Vine maturity: 1 = senesced, 9 = totally green. Air pollution: 1 = defoliated, 9 = no visible symptoms. Shape: 1 = round, 5 = oblong, 9 = very long (cylindrical). Size: 1 = very small, 9 = very large. Appearance: 1 = very poor, 9 = excellent. Skin maturity: 1 = totally peeled during harvest and grading, 9 = skin intact.

^{2/} Defects: 1 = severe, 9 = none. Ratings of heat necrosis made on 20 tubers in the size range 2-1/2" to 3-1/4".

WISCONSIN

R.E. Hanneman, Jr., D.M. Spooner, and J.B. Bamberg

Summary of questionnaire concerning proposed cooperative

enhancement effort with potato germplasm

The USDA, ARS Potato Genetics and Cytogenetic Project associated with IR-1 was directed in 1989 to begin enhancement work with wild and cultivated potato species. As this modest

effort began, a questionnaire was sent out to 17 state, federal and industry scientists involved with breeding and/or germplasm enhancement to determine their interest in enhancement, and to determine the goals that would fit with their programs.

The program has the ultimate goal of developing germplasm that can fit directly into the cooperating breeding programs. This is envisaged to be achieved through the use of the cooperator's parental materials and through cooperative testing and selection, at whatever stage of development the cooperating program wishes to begin to test the generated germplasm at.

Of the 17 scientists contacted, 14 responded. The results of their responses are summarized in Tables 1-3. The principal traits they thought should be focused on were Colorado potato beetle, PLRV, PVY, early blight, Verticillium wilt and heat and drought resistance as well as 2n gametes. There were differences among regions of the U.S. for some of the traits emphasized.

The goals for the responding breeding programs emphasized selection for rounds, longs, whites, russets, high solids, high yield, baking, boiling, chipping, chipping from storage, French frying, and resistance to Colorado potato beetle, PVY, soft rot, early blight, scab, Verticillium wilt and heat and drought stress. These priorities also were affected by region.

Six programs stated that they could handle 5-10,000 clones/seedling per year to evaluate and one program said it could take 10-20,000. Most were willing to accept materials at almost any stage. Only two programs were willing to accept 3x or 5x stocks. Most were willing to test materials for selected traits as a part of their own testing programs. Clearly there is significant interest in a mutual enhancement effort. Every effort will be made to achieve these cooperative goals.

Wisconsin, Table 1. Resistances/traits of interest to concentrate on for enhancement.

<u>Insect resistance</u>	<u>Total</u>	<u>Region of U.S.</u>			
		<u>NE</u>	<u>NC</u>	<u>S</u>	<u>W</u>
Colorado potato beetle	10	3	4	1	2
flea beetle	1	1	-	-	-
leaf hopper	2	2	-	-	-
aphid	4	1	1	1	1
whitefly	1	-	-	1	-
<u>Virus resistance</u>					
PLVR	8	1	3	1	3
PVX	4	-	2	1	1
PVY	8	-	4	1	3
PVS	1	-	-	-	1
<u>Fungal resistance</u>					
foliar early blight	8	2	3	2	1
<u>Rhizoctonia</u>	4	2	1	1	-
<u>Verticillium</u> wilt	9	2	5	-	2
<u>Fusarium</u>	4	1	2	1	-
<u>Phytophthora</u>	1	-	-	1	-
<u>Nematode resistance</u>					
<u>M. hapla</u>	4	1	1	-	2
<u>M. chitwoodi</u>	4	1	-	-	3
<u>G. pallida</u>	2	1	-	-	1
<u>G. rostochiensis</u>	1	-	1	-	-
<u>P. penetrans</u>	1	-	1	-	-
<u>Bacterial resistance</u>					
bacterial ring rot	1	-	1	-	-
bacterial wilt	2	1	1	-	-
soft rot	5	1	1	2	1
scab	3	1	2	-	-
<u>Other traits</u>					
heat and drought	6	1	1	2	2
2n gametes	7	1	4	-	2
hail	1	-	-	1	-
wind	1	-	-	1	-
high beta carotene	1	-	-	-	1

Wisconsin, Table 2. Goals of responding breeding programs.

<u>Skin color</u>	<u>Total</u>	Region of U.S.			
		<u>NE</u>	<u>NC</u>	<u>S</u>	<u>W</u>
white	11	3	5	2	1
red	7	2	3	1	1
russet	10	3	4	1	2
purple	2	1	-	1	-
<u>Shape</u>					
round	11	3	5	1	2
oblong	8	1	3	1	3
long	11	3	4	1	3
<u>Table stock</u>					
baking	9	2	4	1	2
boiling	6	2	3	1	-
multipurpose	1	1	-	-	-
French fries	1	-	1	-	-
<u>Processing</u>					
chipping	12	3	5	1	3
French fries	9	2	4	-	3
<u>Insect Resistance</u>					
Colorado potato beetle	7	3	3	-	1
aphid	3	1	1	-	1
leafhopper	1	1	-	-	-
<u>Virus resistance</u>					
PVX	6	2	1	1	2
PVY	10	2	4	1	3
PLRV	6	2	1	-	3
PVS	1	-	-	-	1
<u>Nematode resistance</u>					
<u>M. hapla</u>	2	1	1	-	-
<u>M. chitwoodi</u>	3	1	-	-	2
<u>G. pallida</u>	4	2	1	-	1
<u>G. rostochiensis</u>	1	1	-	-	-
<u>P. penetrans</u>	1	-	1	-	-
<u>Bacterial resistance</u>					
bacterial ring rot	1	-	1	-	-
bacterial wilt	1	1	-	-	-
blackleg	3	2	1	-	-
soft rot	6	2	1	1	2
scab	8	3	3	-	2

Table 2. (continued)

<u>Fungal resistance</u>	<u>Total</u>	Region of U.S.			
		<u>NE</u>	<u>NC</u>	<u>S</u>	<u>W</u>
late blight	5	3	2	-	-
early blight	8	3	3	1	1
<u>Fusarium</u> wilt	4	2	2	-	-
<u>Rhizoctonia</u>	3	2	1	-	-
<u>Verticillium</u> wilt	10	3	5	-	2
<u>Fusarium</u> dry rot	1	-	-	-	1
<u>Other traits</u>					
high solids	12	3	5	2	2
high yield	11	3	4	2	2
heat & drought	9	2	2	2	3
chip from storage	10	3	5	-	2
2n gametes	7	2	3	-	2
diploids	8	1	4	1	2
haploids	5	1	3	-	1
dormancy	1	-	1	-	-
blackspot/bruising	1	-	-	-	1

Wisconsin, Table 3. Stage and type of enhanced materials acceptable, number of clones/seedlings acceptable, and voluntary screening of resistance/traits by cooperating programs.

<u>Stage and type of enhanced materials acceptable</u>	<u>Total</u>	<u>Region of U.S.</u>			
		<u>NE</u>	<u>NC</u>	<u>S</u>	<u>W</u>
true seed	11	3	4	1	3
tuber populations	11	2	4	2	3
initial screened material	8	-	4	1	3
advanced materials	9	1	3	2	3
parental breeding stocks	8	1	4	1	2
24-chromosome stocks with 2n gametes	8	2	3	1	2
48 chromosome stocks	8	1	4	1	2
36 or 60 chromosome stocks	2	-	-	-	2
enhanced species/selections/populations	11	3	4	2	2
Tuberosum-species hybrids	9	3	3	1	2

Number of clones/seedlings program can accept

1-50	-	-	-	-	-
50-100	4	2	1	-	1
100-500	-	-	-	-	-
500-1000	1	-	1	-	-
1000-2500	2	1	1	-	-
2500-5000	-	-	-	-	-
5000-10,000	6	-	2	2	2
10,000-20,000	1	1	-	-	-

Resistances/traits volunteered to screen

Insects

colorado potato beetle	4	2	2	-	-
aphid	1	-	1	-	-
potato leafhopper	1	1	-	-	-

Virus

PVX	2	1	-	-	1
PVY	3	1	-	-	2
PVS	1	-	-	-	1
PLRV	4	2	-	-	2

Fungi

<u>Verticillium</u> wilt	7	3	2	-	2
scab	5	2	2	-	1
late blight	1	1	-	-	-
early blight	2	-	1	1	-

Nematodes

<u>M. chitwoodi</u>	1	-	-	-	1
<u>G. pallida</u>	1	1	-	-	-
<u>G. rostochiense</u>	1	1	-	-	-

Table 3. (continued)

<u>Other</u>	Region of U.S.				
	<u>Total</u>	<u>NE</u>	<u>NC</u>	<u>S</u>	<u>W</u>
specific gravity/solids	6	3	1	2	-
yield	3	1	1	-	1
chipping	4	2	1	-	1
heat tolerance	2	-	-	2	-
internal quality	1	-	-	-	1
tuber type	1	-	1	-	-

Influence of "bee stick" pollination and emasculation technique on the success of difficult crosses in Solanum (potato)

Some crosses are less successful than expected despite apparent fertility, match of EBN and lack of stylar incompatibility. A common pollination technique in potato is removal of the entire calyx and corolla followed by dipping the stigma in pollen of the prospective male parent. This method of emasculation has been noted to be followed by rapid "bud drop" (abortion of the whole pistil) in some crosses. Brassica workers have found that pollination with "bee sticks" (a honeybee abdomen or thorax glued to a toothpick), can enhance crossing success, presumably because crucifers, like potatoes, are naturally bee-pollinated. As a result of these observations, an experiment was conducted to determine the effects of 1) emasculation by removing only anthers vs. emasculation by removing the entire calyx and corolla with the anthers, and 2) pollination with bee sticks vs. pollination by dipping the stigma in pollen.

Crosses were selected by their poor seed set in past experiences. These were 1) intra-1EBN crosses, 2) commersonii hybrid backcrosses, 3) crosses with complex 8x hybrids and 4) intermates of 4x commersonii x ser. LON hybrids. Four specific matings within each of the above four groups were attempted. Each of the following treatments was applied to each of the 16 matings: AB = Anthers only emasculation with Bee stick pollination, AD = Anthers only emasculation with Dip pollination, FB = Full emasculation with Bee stick pollination, and FD = Full emasculation with Dip pollination. Bee stick pollination was performed by dipping the bee stick in pollen, tapping off the excess and brushing the bee stick against the style. Fruit per 100 pollinations, fruit size (in grams), and seeds per 100 pollinations were recorded. The average across all matings was calculated for each treatment within each of these parameters.

Use of bee sticks improved all parameters both when anthers-only and full emasculation were performed. Anthers-only emasculation improved all parameters both when bee sticks and dip pollination was used (Table 4). The effect of bee sticks was marginally statistically significant.

It is difficult to extrapolate these results to other "difficult" crosses since we usually do not know the nature or cause of the "difficulty". This makes appropriate blocking which would control error and give statistically clear results difficult. This preliminary study does suggest, however, that crosses which give poor results may be enhanced by the use of anthers-only emasculation and bee sticks.

Two other considerations should be noted: 1) Anthers-only emasculation takes more time, so the benefits in seed production must be sufficiently great to offset this. Thus, this emasculation technique is especially warranted (for example), when only a few flowers are available with which to make a cross which is expected to be "difficult". 2) The use of bee sticks is easier than dipping, particularly for flowers which still have corollas (which have been anthers-only emasculated). Thus, use of bee sticks may be desirable for some crossing projects, even when the improvement in seed set is slight.

Wisconsin, Table 4. Average improvement of crossability of difficult crosses in Solanum due to the use of anthers-only emasculation and bee sticks.

<u>Comparison¹</u>	<u>Fruit / 100 poll.</u>	<u>Grams / fruit</u>	<u>Seeds / 100 poll.</u>
AB vs AD	10%	54%	82%
FB vs FD	8%	47%	55%
AB vs FB	38%	57%	40%
AD vs FD	35%	2%	19%

¹A = anthers-only emasculation
F = full emasculation
B = bee stick pollination
D = dip pollination

Chile, 1990,
Argentina, 1990
potato collecting
expedition

Two expeditions were conducted during 1990 in southern Chile and western Argentina to collect potato germplasm, with partial funding provided by the United States Department of Agriculture.

The Chile expedition was conducted by boat throughout the Chonos and Guaitecas Archipelagos from Chiloe Island (42°S) to Laguna San Rafael (46°S). Participants included Dr. Luigi Ciampi and Prof. Andres Contreras of the Universidad Austral de Chile in Valdivia, Dr. Stefano Padulosi of the International Institute of Tropical Agriculture in Ibadan, Nigeria, and Dr. David Spooner.

From the distributional data from this expedition (Table 5) and from Prof. Contreras' 1983 expedition, it appears that a general outline of the total distribution of Solanum tuberosum from Chile is now well understood. Chiloe Island, some of its immediately surrounding small islands, and some mainland areas to the north have many diverse landraces maintained by small farmers, who grow small quantities of these indigenous cultivars in potato fields where modern cultivars form the main crop. These diverse landraces are maintained out of enjoyment of their diverse colors, shapes, and flavors, and exchange of landraces between farmers is a common practice. Although some of these cultivars appear to form persistent weeds in cultivated fields (pers. comm., Prof. Contreras), most must be replanted yearly to survive. Natural, self-perpetuating populations occur off Chiloe Island at Isla Metalqui, a small island on the west side of Chiloe Island, and in islands of the Chonos and Guaitecas Archipelago, in areas mostly between 43°40'S and 45°S, on wave-swept beaches on the outer (western) chain of islands near the Pacific Ocean (one possibly natural inland population was found, however, 1149). The morphological diversity of these outer island populations is much less than the diversity found on Chiloe Island. On this expedition, most apparently natural, self-perpetuating populations in these outer Pacific Islands (1125, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 44, 49, 52, 53) had tubers with white turning pink to purple flesh, white turning pink to purple skin, and white to purple corollas. All appeared to possibly be the same genotype, except collection 1152, which had leaves that appeared different and had entirely white skin and flesh, white corollas, and longer rhizomes up to 2.5m in length, and collections 1128, 46, 47, 48, 50, which appeared to be introduced primitive cultivars maintained near settlements, and 4542, 43 which were modern cultivars found in a trash heap near a recently-abandoned fishing camp.

In my (Spooner) judgement, sufficient germplasm now exists of Chilean Solanum tuberosum ssp. tuberosum, both of the primitive landraces (with 600+ introductions currently maintained at the Universidad Austral de Chile genebank), and of the insular populations in the Chonos and Guaitecas Archipelagos for preliminary evaluation of their breeding potential and phylogenetic differences relative to other populations of Solanum tuberosum. Although additional indigenous insular populations may exist within the areas recently explored, or possibly farther away in islands south of 45°S, more than sufficient material currently exists for preliminary evaluations of these genotypes.

The Argentina expedition was conducted in the Andes from 28°S to 42°S. Participants included Prof. Andrea Clausen (head, potato genebank, Instituto Nacional de Tecnologia y Agropecuaria, Balcarce, Argentina) and Dr. David Spooner.

The focus of this expedition was the following:

1. Collect S. brevidens from throughout its range in Argentina. Prior to this expedition, IR-1 had only one Argentinian accession of this species. This expedition collected 23 new accessions from throughout its range.
2. Search for S. etuberosum in Argentina. We suspected that it would be found in Argentina for two reasons. First, I (Spooner) collected it in Chile in 1989 within 5 km (by road), 3 km (by air) of the border with Argentina (Spooner 4490), and I was told by a passing border guard that it was common across the border on the Argentina side. Second, an Argentinian record is listed in Hawkes and Hjerting, 1969 (pg. 461, Kurtz 10081) from "Cordillera del Atuel" in an area east of known populations in Chile. I suspected that S. etuberosum was rare, but present in Argentina. We were unsuccessful in finding the species, despite extensive searches in apparently appropriate habitats near the border with Chile.
3. Search for S. maglia in the Quebrada de Alvarado, Province of Mendoza. All known populations of S. maglia are in lowland areas in central coastal Chile except for one disjunct population on the other side of the Andes in the Quebrada de Alvarado in the Province of Mendoza, Argentina. Hawkes and Hjerting, 1969 (pg 421) list two collections of this species, but it now appears possible that all collections have been made from a cultivated specimen at Godoy Cruz or represent confusions in labelling. The label for the Argentinian herbarium sheets simply indicate "Quebrada de Alvarado, 1500 m", but this canyon runs 2200-3000 m, and the lowest elevation anywhere in the area is

1600 m in the drainage of this canyon, the Papagallos River Valley. We visited this canyon in a good (rainy) year, on two separate occasions (February 11, 12; March 29) and there were no potatoes to be found anywhere in the area.

4. Collect S. kurtzianum from Mendoza province. Solanum kurtzianum is one of the better-collected species at Sturgeon Bay (IR-1), with 71 accessions, but all were from the northern part of the range in San Juan, La Rioja, and Catamarca Provinces. The 17 new germplasm collections of this species from its southernmost distribution area now provide us with collections from throughout its entire range.

5. Collect S. X rechei. This is believed to be a hybrid between S. kurtzianum and S. microdontum. IR-1 had no germplasm of this species. We collected five accessions.

6. Collect S. venturi. IR-1 had one accession of this species. We collected one additional accession of this species. They were collected in areas where this species had been collected before, co-occurring with S. microdontum. They differed in glossier leaves of a different dissection pattern than S. microdontum.

The results of the expedition are listed in Table 6. My assessment of future collecting priorities in Argentina follow: Argentina is one of the best-collected countries with regard to its native potato germplasm. Of the 3135 accessions listed in the 1986 IR-1 inventory, 1126 (36%) are from Argentina, and this expedition adds even more. Despite these large numbers, however, the collections of some species are heavily out of proportion in relation to others (e.g. S. acaule, S. chacoense, S. megistacrolobum with relatively large collections), and the distribution of some of our germplasm collections covers only a portion of the total known distribution of a species.

This expedition resulted in filling gaps in our Argentinian holdings of S. brevidens (23 new germplasm collections, with only 1 prior collection), the southern (Prov. Mendoza) collections of S. kurtzianum, one new collection of S. venturi (only one collection previously) and five possible new collections of S. x rechei (none held previously). Andrea Clausen presently is planning a second year of a two-year, IBPGR-funded effort to collect S. tuberosum ssp. andigena from northern Argentina. A comparison of the IR-1 inventory with known Argentinian species indicates that gaps remain in germplasm collections of the following species:

- S. calvescens (no collections)
- S. incamayonense (six collections)
- S. X indunii (no collections)
- S. X viirooi (no collections)

Wisconsin, Table 5. Disposition (with summary totals) of materials from the Solanum sect. Petota collection trip to the Chonos and Guaitecas Archipelagos, Chile, 1990.¹

<u>Collection No.</u>	<u>Seeds</u>	<u>Tubers</u>	<u>Herbarium</u>
1125		X	X
1126		X	X
1127		X	X
1128		X	X
1129		X	X
1130		X	
1131		X	
1132		X	
1133		X	
1134	X	X	
1135		X	X
1136		X	
1137		X	
1138	X	X	
1139	X	X	
1140		X	
1141		X	
1142	X		X
1144	X	X	X
1145		X	X
1146		X	
1147		X	
1148	X	X	
1149		X	X
1150		X	X
1151		X	X
1152		X	X
1153	X	X	X
4542		X	
4543		X	
Totals (exclusive of <u>Fragaria</u> <u>chiloensis</u> , 1142)	6	29	14

¹All collection numbers refer to Andres Contreras, Stephano Padulosi, and David Spooner (CPS), except numbers 4542, 4543 which refer to David Spooner (S). All collections are of S. tuberosum ssp. tuberosum except 1142, which is Fragaria chiloensis. All seed and tuber collections from the expedition currently are deposited at the Universidad Austral Genebank, with duplicates (botanical seed and in-vitro cultures) to be distributed later to the Instituto Agronomico Per L'Oltremare and to the Inter-Regional Potato Introduction Project (IR-1).

Wisconsin, Table 6. Summary of materials of Solanum sect. Petota from the 1990 Argentina trip by David M. Spooner and Andrea Clausen.

<u>Series</u> <u>(Sensu Hawkes, 1990)</u>	<u>Species</u>	<u>Germplasm collections</u>
ETUBEROSA	<u>S. brevidens</u>	23
TUBEROSA	<u>S. kurtzianum</u>	24
	<u>S. microdontum</u>	
	<u>ssp. gigantophyllum</u>	13
	<u>S. x rechei</u>	5
	<u>S. spegazzinii</u>	3
	<u>S. venturii</u>	1
	<u>S. vernei</u>	2
YUNGASENSA	<u>S. chacoense</u>	1
ACAULIA	<u>S. acaule</u> ssp. <u>aemulans</u>	9

Reexamination of species boundaries between Solanum berthaultii Hawkes and S. tarijense Hawkes.

Solanum berthaultii and S. tarijense have been recognized as specifically distinct by all taxonomists (i.e., S.M. Bukasov, M. Cardenas, D.S. Correll, J.G. Hawkes, J.P. Hjerting, C. Ochoa), since their original descriptions by J.G. Hawkes in 1944. The following characters and distribution patterns are thought to distinguish the species:

	<u>Solanum berthaultii</u>	<u>Solanum tarijense</u>
Corolla outline	stellate	rotate
Corolla color	blue	white
Glandular pubescence	A + B glands	A glands (no B glands)
Distribution	Bolivia	Bolivia, Argentina

All of these authors have placed these species in different taxonomic series, and Hawkes (1990) recently separated them into different superseries (Rotata Hawkes/Stellata Hawkes) on the basis of stellate vs. rotate corollas. Despite these interpretations of wide divergence, hybrids are believed to regularly occur in sympatric areas. In fact, Hawkes and Hjerting (1989) interpret 25 percent of the naturally-occurring populations of these two species as hybrids.

The difficulty in distinguishing these species on herbarium specimens and in germplasm collections led to the present numerical taxonomic study by Spooner and Ronald G. van den Berg (Wageningen Agricultural University, The Netherlands). Eighty-five accessions of both species and putative interspecific hybrids (determinations from Hawkes and Hjerting, 1989; supplemented by determinations from Hanneman and Bamberg, 1986, these latter determinations provided by J.G. Hawkes or C. Ochoa) were obtained from the Inter-Regional Potato Introduction Station and grown outdoors in a single field at the University of Wisconsin Peninsular Agricultural Research Station in Sturgeon Bay, Wisconsin. Twenty-five morphological characters were measured from four individuals/accession and the average of four characters was taken as representative of the accession.

Two measures were taken of stellate/rotate corolla shapes and analyzed for significant differences. Surprisingly, no significant differences were detected in corolla shape by either of these measures. Additionally, the entire data-set was subjected to a Principal Components Analysis by species and by geographic area (data not shown) and no pattern of variability emerged to support species, hybrids, or geographical groups. A pictorialized representation of the three taxonomically significant characters listed above likewise fails to indicate patterns of variability that supports a hypothesis of species differences between S. berthaultii or S. tarijense.

Because S. berthaultii and S. tarijense have been distinguished in the past on such extreme qualitative differences, and because many other species in Solanum sect. Petota are currently distinguished on minor quantitative differences, it is suggested that the over 220 species listed in Hawkes (1990) may be an over representation of species diversity in this group. More studies of this type, analyzing a wide array of populations in living conditions, where complete morphological data-sets are available, are needed to provide more reliable data on the species boundaries in Solanum sect. Petota.



